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ABSTRACT

The published proceedings of this conference focus on basic issues in the area of institutional research and are limited to those papers presented during the general seminars. Topics discussed were: "A Conceptual Framework for Institutional Research: Three Points of View" (Samuel Baskin; Stuart Grout; Robert E. Hubbard); "The Role of Institutional Research in the Formation of Policy" (Eldridge Scales; Vernon Hendrix; Lois Torrence); "The Role of Institutional Research in the Implementation of Policy" (D. Gordon Tyndall; Carl E. Wedekind); "The Role of Institutional Research in the Evaluation of Policy" (Charles E. Howell; Everett H. Hopkins; James R. Montgomery); "The Role of Institutional Research in the Administrative Process" (James I. Doi); and "New Techniques in Institutional Research" (G. Truman Hunter; Vernon Hendrix; Al Cavanaugh; Joe Saupe; Keith Smith). (CK)

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A CONCEPTUAL FRAMEWORK FOR INSTITUTIONAL RESEARCH

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A CONCEPTUAL FRAMEWORK FOR INSTITUTIONAL RESEARCH

Proceedings of

Fourth Annual National Institutional Research Forum
Hotel Leamington and The University of Minnesota
May 17-20, 1964

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Edited by

Clarence H. Bagley

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WASHINGTON STATE UNIVERSITY
PULLMAN, WASHINGTON 99163

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1963-1964
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PREFACE

The Planning Committee for the Fourth National Institutional Research Forum determined in its initial meeting that some of the basic issues in the area of institutional research should be presented and discussed at the Forum. These basic issues were broadly structured in the presented form so that institutional research as a discipline could be subjected to careful analysis.

The Forum itself was structured to provide a series of general seminars each of which was related to a common area of concern and followed by a special seminar where questions and discussion were held. Thus the continuity of presented papers and the freedom of discussion were combined for each area of concern.

The presentation of papers follows the sequence given in the program of the Forum. The reader should glance through the program to familiarize himself with this sequence and to more fully comprehend the continuity of the papers.

The publication of the proceedings of this conference on institutional research is limited to those papers presented during the general seminars. The participation of the audience in these general seminars and the subsequent discussion by the participants of the Forum during the special seminars cannot be noted in these pages, but their value and contribution to the Forum were significant.

It is the hope that the publication of these proceedings will contribute to an understanding of institutional research as a multi-discipline and to its rationale in planning and evaluation in the educational sphere. On behalf of the Planning Committee, I wish to thank the authors for releasing their papers of the Forum sessions for publication.

Clarence H. Bagley
Editor

PART I

A CONCEPTUAL FRAMEWORK FOR INSTITUTIONAL RESEARCH: THREE POINTS OF VIEW

Presented by

Samuel Baskin
Director of Program Development and Research
in Education
Antioch College

Stuart Grout
Director of Academic Services
Boston University

Robert E. Hubbard
Director of Institutional Research
Wayne State University

Samuel Baskin
Antioch College

My comments will be quite brief and are simply designed to express a point of view about the role the institutional research service should play in the total college or university setting. I've organized my comments under the title: The Educational Researcher: Change Agent or Safety Man? The title is in and of itself tell-tale.

Several years ago in an article in the Phi Delta Kappan, Phil Coombs, then executive secretary of the Fund for the Advancement of Eduction, asked:

> "What would happen if every institution of higher learning had an able top official in charge of research and development, a vice-president in charge of heresy?...... His job would be to welcome fresh ideas, to encourage the trying out of new approaches, to evaluate the results, and to pass these on, good and bad alike, to colleages in his own and other settings."

My thesis today is that educational and/or institutional researchers--and I intend to use the designations interchangeably--need to be taking a far more active role in the innovation and exploration of new program ideas in higher education. The rationale behind my argument is that higher education has for too long allowed itself to be caught up in its own straight-jacket of traditions and customs in teaching and learning. Despite recent developments in higher education, the change agent is still badly needed. My suggestion today is that the educational researcher assume this role and give it top priority in the running of his shop.

Something has been missing for far too long, which I suspect relates to our own unwillingness to examine our assumptions about teaching and learning, and to our unreadiness to ask ourselves some questions about how we go about the educational process. Someone needs to take hold. Why not the educational researcher?

I am not, of course, suggesting that institutional researchers drop everything and begin now to turn their attention to a massive study of the college drop-out. I am, however, suggesting that we have for too long been seen as the institutions' data collection and statistical analysis service. It's time we got into the college classroom a great deal more than has been the case.

I would argue then for a framework for research which defines the job of the educational researcher in the following order:

(1) The researcher must take the initiative and responsibility in encouraging experimentation and research in new ways of teaching and learning. He must serve as the motivating force, or what will be at times the unwelcome prodder, in pressing the establishment for examining what the university does and how it goes about its business.

What about the ways by which we have organized for teaching and learning? What kinds of experiences should the student have in learning--how much teacher aid, how much classroom activity, and how much learning on one's own? What about peer-group and other non-classroom influences in learning? Who teaches what, and how does learning really happen?

(2) The office should have both a research and assessment function. It is not enough, of course, to suggest that the educational research office regard its central function to be encouraging educational experimentation, and to let it go at that. We must do more than simply stir up the trouble, for with the experimentation must come adequate plans for evaluation and assessment. It is most important that someone *other than* the initiator of the idea or the experimentor do the evaluation.

(3) The educational research office must, of course, continue to serve as a significant arm of the college in long-range planning and projections. The budgetary analyses, enrollment projections, space utilization, and class-size studies cannot and should not be shoved elsewhere. However, these activities should not *dominate* as the major, if not sole, function of the research office.

It is, of course, easy enough to propose revolution and then to pack one's bags and go home. Before I *do* pack my bags, I should at least offer a few suggestions as to how one can make some inroads and begin to effect change, if not cause the revolution itself. I draw here largely from our own experiences at Antioch.

(1) Establish faculty project grants. The faculty project grant can serve a most useful function in tapping faculty creativity and in opening up ideas. Several years ago we announced that we were putting a small sum into the office budget for faculty projects and research. This was to be a strictly no-red-tape operation. We simply put a note in *Faculty Notes* announcing that the funds were available and were designed to encourage faculty members to develop any project or idea that they perhaps had long wanted to try out but had simply never gotten around to doing. We would reimburse faculty for a week's salary (although we knew well that most faculty members would probably wind up spending several weeks, if not months, on the project) and provide secretarial and clerical assistance where needed. In the first year of the announcement of the project monies, we had thirty faculty members working with a wide variety of ideas ranging from small-scale, try-out studies in which they experimented with their own teaching methods to more elaborate proposals relating to college course offerings and new program ideas, including in one case a proposal for the establishment of a new experimental college within our own experimental college.

(2) Try bringing in the consultant. No man is an expert in his own home; but bring in the outside consultant, and by and large the faculty will listen. There is much happening all around us in new methods of teaching and learning, in the use of the new media and technology, in the use of independent study, etc. Faculties, let along ourselves, need to be kept abreast of what's happening. The outside expert serves as one way of doing this.

(3) Get out a memo to the faculty newsletter, bulletin, or what have you, but find some way of summarizing--and I mean summarizing--some of the developments that are occurring on the higher educational scene. No one has time to read these days, even in his own field. The quick summary of developments, issued at regular intervals, can do a great deal in keeping faculties on their toes and open to ideas.

(4) Try the faculty workshop idea. Get a group of faculty together simply to talk about what they do in their courses and classrooms, the objectives they seek, and how they try to achieve these objectives. It is amazing how little we

know about what the next guy does and how ready most faculties are, given the proper climate for give-and-take exchange, to seek help and learn from each other.

This, then, is a plea for a new image for the institutional and educational researcher. It is a plea that we assume more of the initiative for innovation and experimentation in higher education. It is a plea that we put our money where it really counts--on the teaching and learning firing line--or better still, on furthering the education of the student.

Stuart Grout
Boston University

My conception of an appropriate framework for institutional research is suggested by the definition I find useful when people ask me what institutional research is about. Institutional research is research about a particular institution of higher learning by those within the institution for the express purpose of aiding in the administration of the institution. It is in a very real sense a tool in the administrator's tool kit. Please do not be misled by my use of the term "administrator." It refers to all who have a role in the administration of the institution. In most institutions this includes significant involvement of faculty. In others it refers to the specialist who devotes full time to the management of one or more programs of the institution.

When, then, does institutional research and the institutional research officer fit into this framework? The answer varies from institution to institution. It may well be that they do not fit in at all. Let us consider, for example, two institutions of higher learning in which the position of institutional research officers has no place. The first institution is characterized by a highly personalized philosophy of administration. Its administrative offers are unwilling to utilize or even accept the implications or findings of institutional studies. Its faculty members prefer an environment of mild disorder and engage in a good deal of institutional "politicking." There are, of course, "sacred cows" wandering all over the campus. I am, of course, exaggerating to emphasize the point I wish to make. Institutional research differs from scholarly research. It can only be justified if it aids the institution and those who are responsible for its operation. Does it, for example, help in formulation, implementation, or evaluation of policy? Administrators must understand how institutional research can aid them and feel the need for such aid. If they do not, institutional research serves no purpose.

A second institution in which there is little need for an institutional research officer is one in which those who administer the institution are so convinced of the usefulness of institutional research that they insist that every administrative staff member be, in effect, an institutional research person.

The major point I wish to make is that the institution must see some real need for an institutional research officer. In my first illustration it was clear that even though the need for institutional research may well have been great, those in charge did not recognize it. In the second illustration the need was recognized but was being fulfilled without the appointment of a specialist in institutional research.

What, then, are the conditions under which an institution should appoint an institutional research officer? Obviously from what I've said thus far, the administration of the institution must first see some useful purpose for a program of institutional research. Once this is recognized, the administrators and faculty must recognize that a specialist in institutional research fills a gap or need not being met by other members of the staff.

In a very real sense, then, the institutional research officer is a resource person. He should be prepared to answer as often as possible two major queries:

1. What kinds of contributions can your studies make to the solution of the particular administrative problem or problems at hand?

2. If he is given an administrative problem or problems, what kinds of studies make useful contributions to sound solutions?

The institutional research officer is a creature of administration and responsible to it. His effectiveness as an institutional researcher is directly related to the administrative environment found in the institution in which he is employed. Although he may shape policy, he is not a policy maker. He may influence decisions, but is not a decision maker. His effectiveness is related directly to the extent to which the administration is research minded and sees the value of institutional research as an aid to the administrative process.

Robert E. Hubbard
Wayne State University

A conceptual framework for institutional research probably should begin with an answer to this question: Why do institutions engage in institutional research? Perhaps the simplest and most direct response is that institutions expect insitutional research to provide data which will improve their operations. Put another way, if institutional research doesn't somehow contribute to improved operations of the university (and I use the term "university" in a general sense to mean any institution of higher education), we probably ought to stop spending increasing amounts of money for the support of institutional research offices and instead direct this money to other purposes such as raising faculty salaries. I suspect many faculty members would judge this to be a good idea, but since I enjoy institutional research work and sincerely believe we in this field are having some positive and measurable impact on higher education, I don't suggest such action at the present time.

Just how does or can institutional research improve university operations? For one thing, we in institutional research can and should be concerned with the directions our institutions ought to be taking. The fact is, however, that most of us are _not_ concerned with university goals or purposes. We devote much time to studying what our institutions _are doing_, but we appear to spend precious little energy studying what directions our institutions _ought to be taking_. I do not suggest that institutional research offices should make policy. I do suggest that institutional research can play a vital role in conducting studies on problems and issues relative to university goals. Such studies can be historical, descriptive, or projective, but regardless of type, the research results should provide the objective data needed for the establishment of changes in long-range goals of the university.

This is the first requirement in my conceptual framework for institutional research: that institutional research must be involved in studies of university purposes--what they are, how they came to be, and what they ought to be. I stress again that I do not believe universities have in any significant way exploited the potential of institutional research offices for long-range planning studies. We in institutional research have not, for example, devoted significant efforts to studying the impact of the geographic setting of our institutions on our program offerings. We have not analyzed carefully the implications of program duplication between our universities and our neighboring institutions as far as institutional purposes are concerned. I will cite examples of such needed research later in this statement.

A second requirement in my conceptual framework is that institutional research should demonstrate, through research, how universities can be organized most effectively to achieve long-range goals. We should, for example, help to identify the kind of financial support needed for programs which our institutions ought to be offering because of their unique geographic, socio-economic, or cultural settings. I also have some examples of this type of research which I will describe later.

The third requirement in my conceptual framework for institutional research is that institutional research must be actively engaged in studies concerning the _effectiveness_ of university programs and operations, again presupposing a clear statement of purposes. This, of course, is the evaluation aspect of institutional research and is the traditional role of institutional research with which most of us are familiar. It includes cost studies, faculty load studies, class size analyses, salary studies, studies of students--their reasons for attending a university, the problems they face while there, what they take with them from the four or more years of exposure to higher education, what difference it makes in their lives, studies of the quality of educational programs, etc. More about this aspect of institutional research shortly.

Let me put this proposed conceptual framework into context with reference to the setting I know best--Wayne State University. Wayne is located in the heart of the City of Detroit and has the typical commuting student body associated with an urban-located university. We are somewhat unique in that we are a state university, even though we provide great service to the metropolitan area of which we are a part. We have a very strong public institution as a neighbor--the University of Michigan--whose sphere of service is considerably larger geographically than Wayne's. Other nearby schools include the University of Detroit (privately supported) and a number of other private and public institutions ranging from community colleges to four-year branches of other state universities, plus extension programs of several kinds. Among Wayne's strongest colleges are the School of Medicine and the College of Education, both of whose origins date back nearly 100 years. We are today a federation of professional and general schools loosely tied together, and we have an emerging graduate program now constituting on a head count basis nearly one-third of our total student body of 22, 000.

Let's examine first the possible role of institutional research in the establishment or modification of university directions. Let me stress that this is an idealized conceptual framework with reference to Wayne, for we do not yet conduct many of the studies which I shall cite by way of illustration.

We should start with consideration of the three broad areas of service traditionally associated with American universities--the functions of instruction, research, and public service. Wayne's Institutional Research Office should conduct on-going studies aimed at determining the specific contributions which Wayne State University can make to higher education in Michigan through each of these three service areas. With reference to instruction, we must study not only the educational programs now provided by Wayne to the City of Detroit, but also those programs which should presumably be offered in future years as the metropolitan area spreads farther and farther from the core of the city. We should study the actual and potential impact on University purpose of student reasons for attending Wayne, and we should examine the changing metropolitan population to help shape decisions affecting long-range plans. We should help to identify program duplication with our neighboring institutions in order to direct financial resources to areas where the need is greatest.

These proposed areas of investigation are especially related to the instructional responsibility of Wayne, but they have implications as well for our research and public service arms. With regard to research, for example, institutional research can, by way of surveys, help to assess the need for the university to contribute through research to local businesses and industries.

Consider next the role of institutional research in identifying new programs or program and operational changes needed to achieve university purposes. Given one purpose--the need for close metropolitan community-university interaction, we in institutional research should study the kinds of formal and informal education and related programs which will best promote such interaction. Our investigations should consider such questions as the following one: What are the places of social work, urban planning, the educational municipal government employees, and other community-related programs in a university committed to close community-university interaction?

We should identify the potential "market" for such programs, and we should help to anticipate changes for specified years in the future. In addition we should help to project the cost of continuing or strengthening programs of this kind in the years ahead.

The third element in my institutional conceptual framework is study of existing programs and operations to determine their effectiveness in contributing to university purposes. This, it seems to me, is where institutional research has made its greatest advances to date, and it is certainly so at Wayne. We are developing quite sophisticated techniques for assessing the costs of University operation, for analyzing class size, for studying salary patterns in different University units, and for compiling factual data on faculty characteristics. These still are largely quantitative studies, to be sure, but they represent some significant advances for us, and are presently or will soon be providing a great deal of potentially useful information for decision-making purposes. We must continue to carry forward objective studies of current programs and operations, hopefully extending these to include more of the less tangible and more qualitative evidences of effectiveness. I believe, however, that more of our energies must be directed to the first two areas--studies of University purposes and studies of the kinds of programs needed to achieve these goals.

In considering how I would develop my conceptual framework for this presentation, I first considered and then excluded from immediate consideration certain factors which I felt helped to define how institutional research can be most productive. I still believe these are peripheral to a conception of institutional research, but since I also believe an awareness of their importance can help to maximize the effectiveness of institutional research, I want to cite them here:

1. First, the most effective kind of institutional research is that which is conducted or repeated over an extended period of time. Not only is the research itself perfected through repetition, but also extremely valuable trend data will become apparent to the analyst.

2. Some of the most positive benefits of institutional research are fringe benefits, i. e., those which occur as a result of the presence of institutional research but which were not necessarily the intent of the research. I have particularly in mind the sharpening of definitions by other university units and the awareness by other units (both educational and service) of the need for greater consistency in the data they gather and maintain.

3. Institutional research will not have real impact on university operations unless specific steps are taken to ensure that the results of research are conveyed to those with key decision-making responsibility. We at Wayne have attempted to promote communication of institutional research results through a weekly "Trend Sheet" published as a staff briefing paper for central university administration. Results of institutional research conducted by my office and by other agencies

on and off-campus are digested and reported in succinct tables and text in this publication.

4. Because of an ever-increasing need to bring together more data from widely varying sources, some kind of storage and retrieval system is needed. We at Wayne have tried to solve this problem through the establishment of an administrative reference library, a highly specialized reference resource for the use of key administrative personnel in the university.

This then is my conceptual framework for institutional research. It stems from the premise that institutional research exists solely to improve institutional operations, and it rests on the conviction that to be really effective in achieving this end, institutional research must concern itself with three types of studies:

1. Those studies which relate to the establishment and modification of institutional goals.
2. Those studies which reveal the ways an institution should organize to achieve these goals.
3. Those studies which evaluate the effectiveness of current programs and operations of the institution.

It seems to me that we in institutional research have made our greatest strides in the studies we are doing on existing institutional programs and operations. I believe our challenge now is to carry forward some really effective studies on long-range institutional purposes and on the programs that institutions need to establish to achieve these goals.

PART II

THE ROLE OF INSTITUTIONAL RESEARCH IN THE FORMULATION OF POLICY

Presented by

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New York State Department of Education

Vernon Hendrix
Assistant Professor of Education
University of California at Los Angeles

Lois Torrence
Director of Office of Institutional Studies
The American University

Eldridge Scales
New York State Department of Education

An Historical View

Educational research as a specialized function of the State Education Department had its beginning in 1920 when the position of "Specialist in Educational Measurement" was created. The Bureau of Educational Measurement was organized in 1923 and became the Division of Educational Research in 1929. In 1937 an Assistant Commissioner for Research was appointed, and the Bureau of Statistical Services was organized. There was little increase in staff size from that time until 1942 when the first lump sum for research was appropriated by the legislature.

In the fall of 1956 an over-all reassessment of staff and function of the research-related offices was made. In accordance with this reappraisal, a reorganization of the Bureau of Statistical Services was formulated.

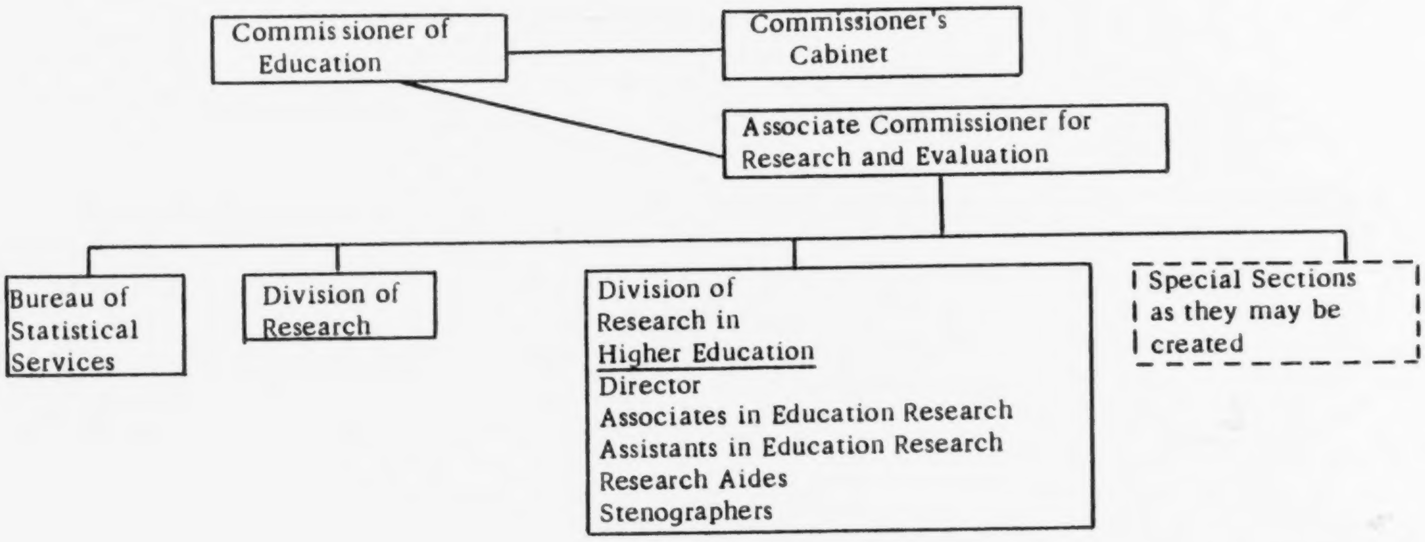
In the early years of the Division of Research, emphasis was placed upon administering standardized tests in the schools of the state. Gradually, the emphasis shifted to working upon a broader range of research problems. At the present time, matters of administrative research related to public elementary and secondary education have become the core of this Division's work. It is still to this Division, however, that the Department looks for exploration and description of new areas of concern.

In 1956, also, the Quality Measurement Project was conceived. In recent months this section has become an integral part of the Experimental Program Section. This section is responsible for encouraging and administering a program of experimental studies of practices in public schools and school systems in the state.

In 1957 special funds for research related to fiscal policy were transferred to the research offices. A special section, structurally similar to the Quality Measurement Project, was created--the Bureau of Educational Finance Research.

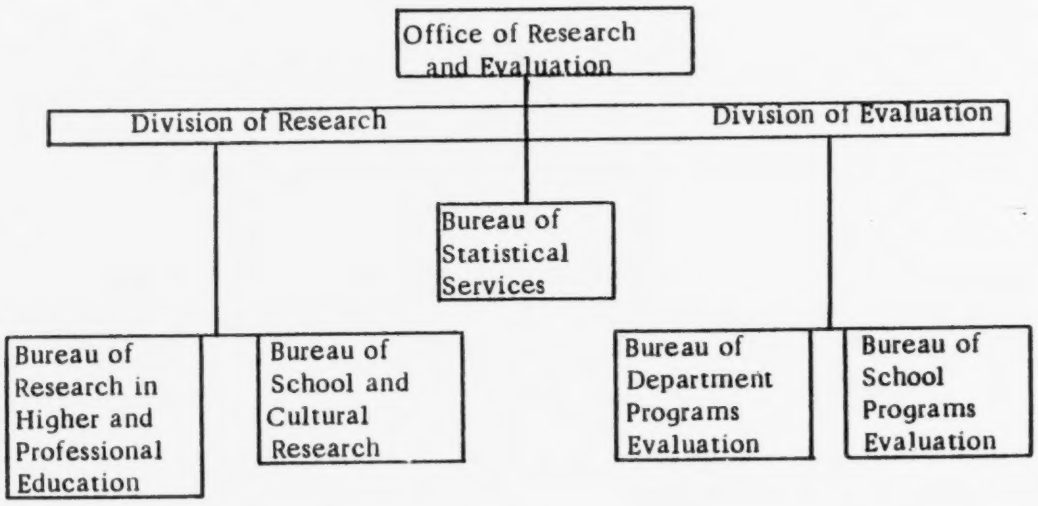
In 1957 the Division of Research in Higher Education was organized. The formation of this new division reflected further broad cognizance of the State Education Department's leadership responsibilities in this area.

The following diagram indicates the general organization of research, the interrelationships within the research offices, and the Division of Research in Higher Education in detail.


Commissioner of Education
Commissioner's Cabinet
Associate Commissioner for Research and Evaluation
Bureau of Statistical Services
Division of Research
Division of Research in Higher Education
Director
Associates in Education Research
Assistants in Education Research
Research Aides
Stenographers
Special Sections as they may be created

The Division of Research in Higher Education is in a staff relationship, through the Associate Commissioner of Research, to the Commissioner of Education.

On May 4, 1964, a memorandum setting forth the reorganization of the research offices was received. The reorganization diagrammed in the following figure may be contrasted with the old organization as seen above.


Office of Research and Evaluation
Division of Research
Division of Evaluation
Bureau of Statistical Services
Bureau of Research in Higher and Professional Education
Bureau of School and Cultural Research
Bureau of Department Programs Evaluation
Bureau of School Programs Evaluation

Special Functions

The functions of the Division in Higher Education are classified as follows:

1. To maintain a continuous, statewide record of recurrent, factual data regarding the operations of colleges of the state so that reliable information may be available as to accomplishments, progress, and needs of the state educational system and its component institutions and universities.

2. To explore and analyze extensive and complex educational issues of departmentwide significance for the purpose of discovering, verifying, and interpreting theoretical principles, new facts, and new techniques and methods, upon which the state educational authorities can plan future policies and programs.

3. To marshall pertinent data relating to those immediate problems of maintaining standards, effecting economies, and improving educational practices arising from the operations of the Department.

4. To obtain and report essential information on broad educational, social, economic, and scientific trends and developments having far-reaching implications for higher education, with the view of identifying the needs for modification of existing programs and practices, and anticipating incipient problems in higher education of the state.

5. To encourage and assist in the educational research in the Department and in the field, and to cooperate with other units of the Department and with colleges and universities in carrying out research studies and projects.

The Nature of Research in the Division of Research in Higher Education

The research services required in the State Education Department are wide in scope, covering all of the activities and interests of the Department. In general, projects carried out by the Division of Research in Higher Education may fall into several realms:

(1) Evaluation. This research is directed toward ongoing programs sponsored or supported (1) by and/or within the Department, or (2) administered by colleges and universities in the state but supported by state funds. Illustrative of evaluation studies are the series of evaluation studies of in-service programs designed for teachers in mathematics and science, foreign languages, and computer mathematics; the evaluation of selected aspects of the program of grants for teachers of the mentally handicapped. At present a study of the college teaching fellowship program is underway.

(2) Applied research. This research is directed toward some practical problems; the results most often are applied toward policy determination. This type of research is generally the type most frequently conducted. A study representative of this type of research is: The Cooperative Study of Teacher Education in Liberal Arts Colleges. This study was a cooperative effort between the Department and 15 private liberal arts colleges. This longitudinal study of liberal arts seniors and graduates who entered teaching was designed to provide a factual basis for change in preparation or method.

Another study illustrative of this category was that of tuition in City University of New York. This project was conducted to provide factual information for the policy-making decisions regarding the effects to the University of applying various amounts of tuition to students at varying socio-economic levels. It also sought to ascertain the impact on the state of a fixed tuition policy at the University.

(3) Basic research. Basic research in educational theory and practice may be carried out by the Division of Research in Higher Education itself or in cooperation with an institution of higher education in the state.

A prime example of this category is the on-going comparative study of two- and four-year college students, a longitudinal study of community and senior (four-year) college and university students in 26 higher institutions in four states. It is a cooperative study involving the division of Research in Higher Education in the New York State Education Department and the Office of Institutional Research of the State University of New York.

These projects of evaluation and applied or practical research will usually be instituted by a request for study from the administrative staff. Projects of basic research will be initiated more commonly with the Division of Research in Higher Education itself. Inevitably, basic research represents the interests of the researchers.

Research at this level is differentiated from institutional research in the individual college or university in probably two significant ways. First, research is conducted to provide some immediate or ultimately useful and factual basis for policy formulation and decisions--not the formulation of policy for leadership in a single institution, but for a group of colleges and universities. In the case of New York State, there are 202 private and public colleges and universities, and more than 32 public and private two-year colleges.

Second, the aspects of evaluation, basic research, and applied research and the topical areas in which they are exercised are more narrowly circumscribed in the Department than they are in a single university. Areas of research in administrative management and planning in higher education, master planning, and planning procedures (in-house evaluation and development of procedures) are the functional areas of specialists. These areas are formed into separate units which interrelate, coordinate, and cooperate with the Division of Research in Higher Education.

In summary, (1) working with a group of institutions, providing data pertinent to sound policy formulation for many colleges and universities or a university system (State University of New York) and its component units, and (2) the partitioning of the topical areas of institutional research with assigned separate offices and specialists appear to be the two patent distinguishing features.

Thus by its organizational nature and functional character, research in higher education is recognized as a special and necessary function in the Education Department. It contributes to the formulation of educational policies by supplying data, information, and knowledge which remove planning and decision-making from the realm of subjective judgment and anchor them firmly in the facts and conditions of the actual situation. Through a continuous search for new principles, new techniques, and new methods of improving educational services and administration, they also give meaning and orientation to the forward-looking leadership role of the Department.

The responsibility of research and statistical services is notably different from that of operating units in the Department. Research is essentially a staff function. The results of research activities and investigations help the Regents, the Commissioner of Education, and his colleagues in the performance of their policy-forming and administrative duties. The results of research, similarly, should be of value to the administrators of the separate institutions that collectively form the universities of the State of New York.

Intrinsically, the nature of the services thus provided is informational and advisory, as contrasted with supervisory or administrative services. Consequently, making administrative decisions and implementing policies and programs are outside the domain of research and remain the responsibilities of the operating units.

Research can indicate possible courses or opportunities, assess the probable results of decisions, test the facts assumed in the making of decisions, and clarify problem definitions. All this should be helpful to administrative decision and policy-making, but it is not to be confused with such operational responsibility.

Since research serves operation, there is need for close working relations between research personnel and line administrative personnel. There is a need for clear channels of two-way consultation and reporting among all involved.

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It is probably appropriate that someone from U. C. L. A. make this first presentation before the N. I. R. F. on institutional research in junior colleges. Over half of the nation's junior college students attend California junior colleges, and over 45 per cent of California's junior college students attend one of the 18 junior colleges in Los Angeles County. Statewide, about half of all lover-division enrollments are in junior colleges. From among the 35 junior colleges in Southern California, I could identify at least 5 with more extensive institutional research facilities and staffs than would be found on any university campus in the state, although the largest single junior college in this group enrolls only about 13, 000 students.

Probably the latest information regarding institutional research in junior colleges is in the hands of Mr. H. L. Swanson, co-ordinator of research placement, at El Camino College in California. Mr. Swanson is currently completing his doctor's degree at U. C. L. A. in junior college administration. He has several thousand examples of institutional research from both public and private junior colleges in 47 states.

Three hundred thirty-seven junior colleges (243 public and 94 private) were surveyed in 1962. This sample appears to be representative of junior colleges, especially public junior colleges, and includes fifty per cent of the two-year colleges that were then members of the American Association of Junior Colleges.

Some statistics might briefly sketch the picture of institutional research in these colleges:

1. Only 46 (19 per cent) had any type of formal organization for institutional research.
2. Only four colleges (three public and one private) had persons assigned full-time to institutional research.
3. Fifty-six (23 per cent) had persons assigned part-time to do and/or coordinate institutional research.
4. Fifty-five (22 per cent) colleges had committee structures to steer, plan, stimulate, and design studies.
5. One hundred four (30 per cent) used outside experts or teams, most of these being from universities, state agencies, or occupational groups, especially union and employer groups.
6. One hundred forty-one (41 per cent) reported that a wide variety of staff committees played a leading role in the institutional research program, such as student government, trade and industrial advisory, and various faculty committees.
7. Sixty per cent provided clerical assistance, supplies and equipment, and data processing assistance. (For example, one California junior college has three computers. It provides

instructors on the first day of classes with class rolls which contain complete student test and achievement records. Instructor tests are scored and completely item-analyzed within 24 hours. All types of cumulative records are maintained by class such as grades, probability of student success in later classes and after transfer, etc.)

8. Only 30 (9 per cent) have separate budget items for institutional research.

9. The studies submitted for analysis were found to distribute themselves approximately into the following classes (following Brumbaugh's classifications): student data (prediction, follow-up, drop-out, etc.) comprised 20 per cent each; all other studies, such as admission and enrollment, administration and organization, finance, goals or objectives, plant, and public relations constituted 10 per cent of the studies.

Several problems or needs are readily apparent:

1. Institutional research personnel need training in research design, measurement, etc. The many poorly designed and executed studies bear witness to this.

2. An "institutional research atmosphere" must be established, so that as many of the staff as possible are interested and will participate in institutional research. One president underlined this by stating: "You don't have inspired teaching without intellectual or scholarly curiosity." Another president said: "Junior colleges claim excellent teaching without research to prove it.

3. More inter-institutional cooperation and sharing must be achieved. For the past three years a group of institutional research personnel from about 30 junior colleges in Southern California has been meeting twice each year to discuss and share information. Last month, the Junior College Leadership Program at U. C. L. A., in cooperation with this group, held a one-day conference attended by 75 people representing 28 colleges. We hope to make this an annual offer. Recently, some northern California junior colleges have become interested, and there is talk of forming a statewide institutional research group in conjunction with the California Junior College Association.

In general, progress has been made, and the need for more and better institutional research is acutely felt.

To illustrate what institutional research is being done by one California junior college, I would like to summarize from the annual report of one research office. More extensive institutional research programs could be found in other California colleges, but this was selected as typical of the larger colleges.

"Institutional research has been defined in many ways, but here we broadly define it as any study, formal or informal,

> made on the campus or any part of the campus, its programs, or its operations by any group or individual. This gives wide latitude and encompasses all scientific studies from those which might be called 'basic research' (such as experimental study comparing methods of teaching a certain class) to the summarizing of statistical data which might be used in making wise decisions and in developing policies."

The research office of this junior college has many functions which can be of value to faculty and staff members. Such functions include:

1. Serving as a library of research materials, i. e., study reports, data, and historical materials about the college; study reports on many subjects; books; periodicals; etc.

   > "Your help [this being addressed to the faculty] is urgently requested in the collection of such materials that can be catalogued and readily used by more people. If you have class or degree projects that you have done concerning the college, study reports of historical value, or other materials relating to possible institutional research that you come across in your reading and contracts, we would certainly appreciate receiving copies, or hearing about them."

2. Responding to questionnaires, of which there are hundreds throughout the year. Many questionnaires are coordinated and answered by this office, which saves the time of other professional people. Questionnaires can be much more easily answered if a broad basis of information can be developed.

3. Assisting in conducting studies for the college. Institutional research is a matter of teamwork by many people. Certain studies will be initiated and/or accomplished by an individual; others by small "ad hoc" committees; still others by larger, long-term committees; and some by outside consultants. In this process the research office can function in a variety of ways such as:

   a. Serving on study committees in different capacities--member, chairman, secretary, consultant.

   b. Assisting other individuals doing studies by helping to plan, design, collect data, duplicate reports.

   c. Assisting with follow-up studies.

   d. Providing some secretarial/clerical help.

4. Conducting some studies of the type that will provide statistical information to answer such questions as: What are other junior colleges doing in honors programs? How do other junior colleges deal with parking problems?

5. Coordinating institutional research at the college by:
    a. Maintaining a master list and file copies of what has been done. These could include departmental studies, student projects reports, graduate term papers, and master or doctoral theses.
    b. Obtaining copies of reports for research files and dissemination.
6. Helping disseminate research information and recognizing effort in the field.

This college maintains three files which are brought up to date annually. They are as follows:

a. A master list of institutional research at the college. Thirty-four studies were completed in 1962; twenty-eight were completed in 1963; and fifty-two have been completed or are in the progress this year.

b. Continuing institutional reports in areas that are maintained at periodic intervals, such as grade surveys, testing summaries, various administrative tests of students for honors lists, placement tests lists, room utilization surveys, enrollment comparisons, placement reports, and probation statistics.

c. List of projects currently in progress.

In summary, this is not a comprehensive report of institutional research in junior colleges, since sufficient data and length of experience are not available. The first full-time institutional research officer in junior colleges, except for isolated examples such as Stephens College, would barely cover the last ten years. Most papers and publications about institutional research in junior colleges, such as Stickler's speech at the 1961 convention of the American Association of Junior Colleges (the first such speech at an A. A. J. C. convention) and the 1961 conference at U. C. L. A., deal in broad general statements concerning purposes, importance, organization, implementation, and methods. The conference held at U. C. L. A. this spring is, to the best of our knowledge, the first to deal with substantive matters and specific studies. This conference may well result in the formation of a statewide junior college institutional research organization, perhaps an arm of the California Junior College Association, and a depository and retrieval system to facilitate the rapid sharing, pooling, and exchange of data among colleges. This would be assisted by an E. D. P. system, likely housed at U. C. L. A.

Concerning the use of institutional research in the formation of policy, only a few examples might be cited. Stephens College is probably the most visible example. In most instances, junior colleges use institutional research to evaluate policy, measure effectiveness, and predict things of concern such as student enrollments in various curricula, achievements, etc. This brief report will, it is hoped, give some idea of the scope and depth of institutional research in junior colleges, the great amount of interest in such research, and the developments ahead.

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There are today several very effective regional, state-wide, and miscellaneous cooperative ventures in institutional research. Such groups presume effective institutional research on the individual campus, and the results of cooperative studies are, in the last analysis (at least for private institutions), meaningful principally in the context of the individual institution. It is to institutional research on the individual campus that I have been asked to direct my remarks this morning.

Why does a college or university establish a special committee, office, or agency for institutional studies? Since specific reasons will vary with each institution, I can speak only for my own university. Several factors made such a move a logical one for us. Our student body had grown very rapidly over the past decade (from about 4, 000 to 9, 500 with 3, 800 of these full time); we had decentralized administratively into six colleges and schools and a large non-degree division; data processing (begun in 1955 with the Registrar's office functions) had expanded into admissions, accounting, business office, and other operations; and an IBM 1401 was to be in use by fall 1963. A great deal of raw data were available, but largely untapped and seldom adequately interpreted from a university-wide viewpoint. The necessity of effective coordination and interpretation of information became obvious in the course of the two-year intensive work of a faculty self-evaluation committee preparatory to the normal decennial visitation of the regional Middle States Association in the spring of 1963. Though perhaps overdue, the decision was made late in 1962 to establish self-evaluation as a continuing function at the University and to focus the responsibility for certain phases of this process in an office of institutional studies, effective July 1, 1963.

No specific ground rules concerning the operation of the office were set out when the basic decision was made. Instead, I was asked by the president of the University to visit several colleges and universities to see what they were doing in this field. As a result, I visited last spring some 12 institutions in New York, Pennsylvania, Ohio, and Michigan, and, in addition, attending the meeting of this group at Wayne State. The colleges were selected to give as varied a picture as possible--large, small, public, private, urban, rural, some with highly developed programs of institutional studies, and some with no formal structure for this purpose.

For me the experience was excellent, and I would recommend such a venture to anyone in the field and, indeed, to those who have been in this area for many years. Conferences such as this one are valuable in the exchange of ideas and experiences. However, the real feeling for the role or absence of a role for institutional studies is to be found on the campus itself.

I received a wealth of advice--direct and indirect. Needless to say, I have not followed all of it--sometimes deliberately, sometimes quite helplessly, as for example, the cardinal rule advanced by one person--"Don't let anyone impose deadlines." I must have a serious talk with that gentleman again. Another recurring theme--"Get adequate budget and staff"--is, I am sure, familiar to all of us.

Did I acquire any over-all impression of the role of institutional studies on the individual campus? At the risk of oversimplification, the organizational structure which I found could be divided in four general categories:

1. In four of the 12 institutions no central program of institutional study existed, although in one instance the title was held by an administrative official with another position which required his full time. In the other three colleges there was no lack of interest in self-study, and several individual offices--registrar, dean of students, development office, etc., --did conduct studies of a limited nature. In two instances moves toward coordination were under consideration.

2. In one college the research was under the direction of a faculty committee, coming chiefly from the psychology and education departments. Graduate students were used to conduct studies of student motivation, attitudes, etc. In this college there appeared to be no working relationship between the institutional research office and the policy determining structure.

3. Although an office of institutional research existed in two large institutions, several other offices also were engaged in special phases of institutional study. There appeared to be fairly close cooperation between some of these offices, but duplication of effort was also evident. Reports seemed to be principally statistical in nature, and if analysis was a function of the office of institutional research, this was not readily evident.

4. In two universities the collection and analysis of data were clearly combined and, in addition, the office of institutional research designed and carried out research projects on students, faculty, management, and many other phases of the operation of higher education today.

The validity of my impressions--and I stress the word impressions--on both the organization and on the role of the office is, of course, limited by (a) the short period of time involved in each visit, and (b) the fact that my conversations were for the most part with individuals engaged in institutional study who naturally would have some degree of vested interest in their position and its role on their campus. In this context I would summarize my impressions of the varied approaches to institutional study in these terms:

1. Institutional study is not solely dependent on the creation of a formal administrative unit for this purpose; nor does the existence of such an office on paper assume an operational unit.

2. At least in larger colleges the coordinating influence of an office of institutional studies can be a major source of strength for both the university and the office itself.

3. Offices engaged primarily in behavioural and theoretical research seemed to be removed from the mainstream of university operations and to have little influence in the on-going formulation and implementation.

(I would add that in my opinion the use of the word "research" in relation to what the majority of us are doing is misleading. We are engaged in important studies, but seldom in actual research.)

4. Offices which concentrated on the collection and collation of statistical data without interpretation and analysis obviously performed a useful function, but it is difficult to generalize on the role of such offices in policy formulation.

5. The offices which appeared to be the most effective were those which combined collection and analysis of data with a close working relationship with the top academic officials of the university.

6. Finally, the role of an office of institutional studies will differ as much as the institutions themselves vary and, more specifically, as much as the primary interest of the individuals responsible for the studies will vary. As directors of institutional studies, the approaches of a statistician, a psychologist, a sociologist, or a scientist will inevitably be influenced by the discipline from which each is drawn. This is both a strength and a weakness--strength from infusion of new and valuable insights and techniques, but weakness from the viewpoint of continuity of operations and comparability of studies.

What approach did we adopt at the American University, and what has been the experience of the office in these initial months?

Administratively, the Office of Institutional Studies is responsible to the Vice President. The staff consists of a secretary assistant and myself. Cooperation from admissions, business office, and other administrative units has been very good, but the objective of full coordination of data and mixinum utilization of the computer has not been achieved.

In part this has been my own decision. In the initial process of determining the most useful data and the kind of analysis needed, I found it very valuable to work directly with the available figures from the various source offices--registrar, admissions, accounting, etc. I am convinced that any attempt to program the needs of the new office for the computer without having been immersed in the relatively "raw" material compiled through the earlier data processing equipment would have resulted in many faulty reports and costly trial and error. May I add hastily that I have no intention of prolonging this initial period. Our basic institutional study needs will be programmed shortly for routine production, and we will be able to move into new areas for study.

What types of studies have been carried out this year? Briefly, they include the following:

a) Academic characteristics of entering freshmen (not new).

b) Relationship between sources on CEEB Verbal and English Achievement and grades in English composition for the fall semester.

c) Academic characteristics of transfer students with special reference to junior college graduates and performance of these students in the fall session.

d) Preparation and analysis of a questionnaire distributed to all seniors and freshmen concerning their reaction to our university requirements or general education program. (Initiated spring 1963 under the direction of the Continuing Committee on Self-Evaluation.)

e) Academic characteristics of entering graduate students.

f) A profile of the graduating seniors of last June--including entering qualifications, date, transfer status, GRE, rank in graduating class major, etc. (not yet completed).

g) Presentation--graphic and oral--of an "information" session for the University Senate on the changing nature of the student body between 1958 and 1963. The same material was later presented to the Development Committee on the Board of Trustees.

h) A wide-ranging study of the curriculum under the direction of an administratively appointed committee on curriculum problems.

Have there been any results from these studies? In terms of policy changes, only one action has been taken. As a result of the study of the performance of transfer students, the Admissions Committee recommended and the University Senate adopted a change in the degree of requirements for transfers from junior colleges.

Following the information session on the changing nature of the student body, the Senate appointed committees on graduate students and on part-time students. Senate discussion of their finds will take place next Wednesday.

Over the past few months a large proportion of the work of the Office of Institutional Studies has been devoted to the curriculum study. Using the academic years 1958-59 and 1962-63 as base years for comparative purposes, we collected and analyzed information on a variety of matters related to the curriculum in its broadest sense.

The studies include for each department and school (some 220 instructional units):

a) number of courses offered.

b) number of full-time and part-time faculty and full-time equivalent teaching faculty.

c) the proportion and level of classes and credit hours taught by part-time faculty.

d) student credit hours by status of the student and by levels of courses.

e) number of majors, full time and part time.

f) number of degrees granted.

g) average class size--for each of three levels of courses and for all courses.

h) number of courses with enrollments of less than 10, less than 15, etc.

i) composition of enrollments in our mixed levels--graduate and undergraduate--courses.

j) average student credit hours for classes taught by full-time faculty, and by part-time faculty.

k) average yearly student credit hour production by full-time faculty.

l) instructional salary costs--full time, part time, and total faculty--per student credit hour.

m) total departmental costs per student credit hour.

n) use of comprehensive examination fields by candidates for graduate degrees.

o) courses taken by graduate students who received degrees in June 1963.

These studies served as the basis for a draft report on curriculum problems which has just been presented to the University Senate. After faculty discussion the final report will be presented to the President and the Board of Trustees.

Apart from the collection of data, what has been the role of the office of institutional studies in the preparation of this report? I realize there is, among leaders in this field, substantial disagreement at this point. In the context of my own experience I must side with those who believe that to be most useful for the university--and, incidentally, most satisfying personally--institutional study should include participation in policy recommendations. This was the case in our curriculum study, and I found it a rewarding experience. Policy recommendations and the actual making of decisions are not, however, identical. One may participate in these decisions through your faculty status on the one hand and, perhaps, through membership in a dean's committee or other administrative council on the other hand. However, an office of institutional studies can usurp neither faculty nor final administrative responsibility in the decision-making processes.

Implementation of policy normally will not be a direct responsibility of our Office of Institutional Studies. Probably the most significant contribution of my work at this point will be the providing of a constant flow of data for management analysis and planning, especially in academic areas which often are neglected in the cost-conscious orientation of our business office. The leavening effect of academically oriented studies to offset purely financial ones is essential today. The faculty will not be easily convinced that management analysis of academic affairs is in any way in their interest. But today with institutions of higher education--especially private institutions--facing increasingly complex and multi-faceted problems, the laissez faire approach to curriculum advanced by many faculty members must be modified. If the leadership in developing new principles for academic management and planning can emanate from those clearly dedicated to academic concerns, then the faculty may be led--though protesting, at least not screaming--into the realities of tomorrow.

PART III

THE ROLE OF INSTITUTIONAL RESEARCH IN THE IMPLEMENTATION OF POLICY

Presented by

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In approaching this question of the role of institutional research in the implementation of policy, one must emphasize the concept of decision-making, and ask what decisions are involved in the process of policy implementation. What role, if any, should be played by institutional research in this process in an institution of higher education.

I should therefore like to preface my remarks by quoting at some length from that classic in the field of the theory of organizational decision-making, Herbert Simon's Administrative Behavior. Speaking of the role of knowledge in rational decision-making, Simon writes:

> "At each moment the behaving subject, or the organization composed of numbers of such individuals, is confronted with a large number of alternative behaviors, some of which are present in consciousness and some of which are not. Decision, or choice, as the term is used here, is the process by which one of these alternatives for each moment's behavior is selected to be carried out. The series of such decisions which determined behavior over some stretch of time may be called a strategy.
>
> "If any one of the possible strategies is chosen and followed out, certain consequences will result. The task of rational decision is to select that one of the strategies which is followed by the preferred set of consequences. It should be emphasized that all the consequences that follow from the chosen strategy are relevant to the evaluation of its correctness, not simply those consequences that were anticipated.
>
> "The function of knowledge in the decision-making process is to determine which of the alternative strategies. It is the task of knowledge to select from the whole class of possible consequences a more limited subclass, or even (ideally) a single set of consequences correlated with each strategy.
>
> ". . . in order to perform with perfect rationality in this scheme, (man) would have to have a complete description of the consequences following from each alternative strategy and would have to compare these consequences. He would have to know in every single respect how the world would be changed by his behaving one way instead of another, and he would have to follow the consequences of behavior through unlimited sets of values. Under such conditions even an approach to rationality in real behavior would be inconceivable. Fortunately, the problem of choice is usually greatly simplified by the tendency of the empirical laws that describe the isolated subsets. Two behavior alternatives, when compared, are often found to have consequences that differ in only a few respects and for the rest are identical. That is, the differential consequences of one behavior as against an alternative behavior may occur only within a brief span of time and within a limited area of description. If it were too often true that for want of a nail the kingdom was lost, the consequence chains encountered in practical life would be of such complexity that rational behavior would become virtually impossible."

To this, I would only add, from my limited knowledge and experience, that in an educational institution many of the decisions which must be made involve alternatives which have differential consequences over spans of time and which are much greater than the comparable decisions to be made in industrial organizations.

When we speak of the role of institutional research in the implementation of policy, what do we mean by the phrase "implementation of policy"? All too often the phrase seems to imply that persons known as policy-makers make certain decisions as to policy, and that these policy decisions are then handed down to administrators who must implement them. The implication that policy-makers do not administer and that administrators do not make policy is a thoroughly misleading one for any large complex organization. I can assure you that it is misleading for the University of California, and I am certain that it is equally misleading for any institution large enough to sport an institutional research office.

Policy decisions are made at each and every level in an administrative hierarchy, and at each level there is a problem of implementation. Implementation. Implementation at one level requires policy decisions which must then be implemented at the next lower level in the hierarchy. It is also frequently true that decisions reached at one level crucially determine the decisions which will be reached at a higher level (in that they constrain the available alternative by their failure to suggest or to provide data relating to other alternatives). They may have a decisive influence on decisions at or on the same level but in another sector of the organization. The distinction between line and staff which was made by Mr. Scales this morning becomes very hazy in practice in an educational institution and may not be a meaningful distinction at all.

Perhaps we should pause a moment and ask what we mean by policy. At the highest organizational level it usually takes the form of some broad statement which is meant to guide the more detailed planning that must be done if the policy is to be implemented; I think it is reasonably clear that institutional research has an important role to play in that implementation. Let us consider an example or two from the arena of higher education. Assume that the Board of Regents has unanimously approved a resolution in which they enthusiastically endorse the plan proposed for a new campus, lauding the spirit of adventure and experimentation which has motivated it, urging that every effort be made to make optimum use of the natural environment in which the campus is to be located, but requiring that costs on the new campus must not exceed those on the other campuses of the university. This presumably is a policy.

Its implementation requires that a number of very difficult questions be raised and answered. What costs are relevant, and how should they be measured? Are we interested in costs per student, per full-time equivalent student, per student credit hour, per course, per full-time lower-division equivalent student, or per degree granted? In these computations how do we treat and measure the costs of research and public service? With what costs would they be compared: those on the lowest cost campus in the system, the highest-cost campus in the system, or some average-cost figure? And what of campuses with a medical school--should medical school costs be excluded? What is the appropriate time dimension, i. e. are we to compare costs in the first year of operation, the tenth or the fifteenth? And so on and on.

It is obvious that the formulation of a framework for a study to begin to explore how this policy is to be implemented is a major task in itself. Who is to be responsible for doing and coordinating the immense amount of staff work that will be required if responsible answers to these questions are to be obtained? The many different offices within the university will need to be involved to various degrees in order that their experience and training can be brought to bear on certain questions, but someone must structure, plan, and coordinate their efforts.

In addition, consider a different type of policy decision--one that has been reached this time by the president's cabinet and/or his council of chief campus officers, that the present methods of counting graduate students is inaccurate and misleading and that some better method must be devised.

But now this policy must be implemented. If your institution is anything like mine, a committee will be set up to develop a revised procedure, and you will be its secretary or at least will be expected to provide it with data in copious quantities.

By reading the minutes of the meetings at which this policy decision was reached or by talking to some of those who were involved in the meeting, one discovers that the university should distinguish between specific types of graduate students, and develop a counting or measuring system which is "meaningful" for each type. Someone then must decide what categories or types are meaningful for this purpose, whether an approach based on student credit hours, work undertaken, or some other type of measure is to be used; and if student credit hours are to be used, whether a different divisor is to be used in the several graduate schools in order to determine the F. T. E. in each school, or whether a uniform divisor is to be used for all schools. Finally someone must decide whether the registrar, the department chairmen, the graduate dean, or the accounting office is to be responsible for the actual collection of the data and their transmission to those who have some interest in it. Where does policy end and implementation begin? I am tempted to answer that the question has no answer because it is not a meaningful question in the first place.

Consider an example from a different field, The policy of the institution is to achieve a given standard of space utilization of its class laboratories. How is this policy to be implemented? First, we must know what our present rate of utilization is, and the answering of this seemingly simple question will immediately raise a whole host of difficult questions involving important policy decisions, e. g., what rooms do you count, what hours do you count, and who is to be responsible for the reporting and for the analysis? But this is only the beginning; we must then ask what we can do to improve the utilization, what alternatives are open to us, what the advantages and disadvantages of each are, what authority we must have to explore these in depth, and then how far we should actually try to explore each of them (e. g., what are the educational effects of $1\frac{1}{2}$ hour as opposed to hour classes on Tuesday and Thursday, of evening classes, of block scheduling, etc.). This will lead to even more fundamental questions. What criteria should be used in evaluating the advantages and disadvantages of the several alternatives? Also, do we have the authority or perhaps the temerity to suggest that the original goal should be re-examined since the conditions which existed when the policy was originally established have changed so drastically that it is no longer meaningful.

The point I wish to make and emphasize is that there is always a need to delineate policy, that is to develop the implications of alternative interpretations of policy and/or alternative means of implementation and even of specifying the alternatives which will be considered. This inevitably involves a myriad of policy decisions as these interpretations and alternatives are explored. The implementation of policy serves only to open a whole range of further questions to which answers must be found. I do not argue that the office of institutional research can or should try to do this job alone or even that it should be responsible for coordinating the efforts of the many persons who should be involved from time to time in these efforts, though this job must be done somewhere within the administrative structure of the university, but I am convinced that institutional research must play an active role in the process. As you can see, I think of institutional research within a university as something akin to operations research in a large business enterprise. Operations research was done in business long before offices of operations research were set up, and likewise institutional research was done in higher education long before offices of institutional research were established. But now that we have been institutionalized, we want to find our proper role and place in the administrative hierarchy. The purpose of operations research has been stated in Methods of Operations Research as "providing executive departments with the quantitative basis for decisions regarding the operations under their control."

Does not institutional research have the same purpose in the educational institution? Offices of operations research, too, are fumbling for their proper role, from pure research at one extreme to involvement in day to day line operations at the other. I think that we will have something to learn from them in this regard, and perhaps they from us. However one thing seems clear: They have found that a central part of their role lies in the implementation of the plans which they develop for consideration by management, not that they substitute themselves for the operating management, but that it is essential that they interpret the plan and that they assist in the detailed development, including the evaluation and control aspects (which will presumably be discussed in tomorrow's sessions). I believe that this is equally true for institutional research.

Carl E. Wedekind
University of Pittsburgh

What is the proper role of institutional research in the general areas of institutional policy? I submit the following:

The role of institutional research in the formulation of policy is essentially an advisory function. The institutional research functions should be placed at the highest possible level of institutional management to minimize administrative filtration. However, it is this top-level location for an effective role in policy formulation that makes policy implementation difficult to avoid. The office of institutional research has the responsibility to obtain data of all sorts (including conferences, opinions, and reactions from all sources and levels), to collate them in an orderly and meaningful way, to interpret them, to point out their significance for effective institutional operation, to highlight those aspects which have significance for policy, and to suggest a course or alternate courses of action where it is appropriate and necessary. This is the staff function. It is not a decision-making function. Although institutional research may clearly point up or even recommend a particular method of implementation, the decision must be made by top management. Actual policy implementation, however, is basically a line function and should be carried out and directed by the operating unit. Industry found this out long ago.

Secondly, institutional research should play a major role in the evaluation of existing policy within an institution. This involves not only an evaluation of the particular policy in the light of institutional objectives, but includes as well the evaluation of the effectiveness of the line operations in carrying out these policies. If institutional research is to play a role in both the formulation and evaluation of policy, it should not be involved in the implementation process. If this were the case, it would be difficult for the research man to maintain an unbiased and objective frame of reference for evaluating a system for which he may also have had the responsibility of implementation. In short, implementation and evaluation within the same agency seem to be a contradiction in fact. Were it not so, I suspect many consulting firms and accreditation bodies would have long ceased to exist.

Institutional research is a staff function. It is not executive or line, and as such, ideally should not make or carry out policy decisions. To the extent that an institutional research office does get involved in the implementation process, it becomes less capable and effective in carrying out the evaluative functions. Also, it is more likely to operate under some other aegis than institutional research, such as administrative, academic, or institutional planning. As a viable entity an institutional research unit can be involved in the formulation and implementation process or the formulation and evaluation process, but not all three.

This leads into another major role which the institutional research office can play, a role that has often been stressed by many of those involved in institutional research. (This role was particularly well expressed by Dr. Stecklein at the 1961 American Council on Education meetings in Washington, D. C.) Basically the point is this: the role of an institutional research office should be to serve the faculty as well as the administration of the institution, and this service should be in a direct as well as indirect manner. Many institutional research offices stress this particular function and have as a consequence done much to bridge the gap that exists between the administration and faculty, particularly in the area of communications between and within these groupings. The extent to which this role can be accomplished depends on the degree to which the office of institutional research can remain both fish and fowl by keeping a foot planted firmly in both camps. As anyone can tell you, this is an extremely uncomfortable, awkward, and tiring position to hold for any length of time, particularly if the chasm is of considerable width, and one has to bend over in order to keep his nose to the grindstone. It is a doubly difficult position to maintain since the majority of the requests for information and research will come from the administrative quarter. This has been counteracted to some degree in one of two ways: either both the institutional research officer and his staff come from the faculty, or they have joint faculty and administrative appointments. If we accept the liaison and interaction role as a desirable one, I would strongly urge that such an office exercise caution in order to avoid involvement in the implementation process or phase. The more an office becomes involved in policy implemenation, the stronger grows the administrative image. As a result, academic acceptability wanes.

The institutional research function in our office, as you have no doubt gathered from the title--educational planning, does invariably get involved with the implementation of policy. This is further pointed up in the fact that under the institutional research function only a portion of educational planning comes directly under the Assistant Chancellor for Planning and Policy Coordination. This office in which the institutional research resides also has a stated direct and indirect staff responsibility to the faculty as well as the administration. This relationship has been most difficult to maintain behaviorally for reasons previously mentioned, particularly because of the high level at which such an office is placed organizationally.

Most institutional research offices, no matter how assiduously they may try to avoid involvement in the area of policy implementation, do or will get involved in this role from time to time. Our own office has been involved to a considerable extent in policy implementation in such areas as curriculum, physical plant, student affairs, business affairs, and community affairs. Personal observations indicate that policy implementation is most effectively carried out by an institutional research office when it occurs as follows:

1. for a short and predetermined trial period, and then preferably only if
2. it is coupled with a previously and objectively conceived evaluative research design; and failing of these, only if
3. you cannot persuade your president otherwise.

In addition the negative aspects of actively taking such a role are considerably less when policy implementation takes place in the administrative as compared to the academic area. Policy implementation by institutional research in those areas which are generally identified with the faculty and academic officers is one of the surest methods of becoming labeled as an administrator, rather than as an institutional research person. Formulation and evaluation are activities readily accepted by all groups; however, the implementation becomes a synonym for meddling and interference where the academic area is concerned. Once this happens, it becomes increasingly difficult to involve the faculty as colleagues in or customers of institutional research endeavors. Your evaluation process then becomes viewed by the faculty as a procedure in which you provide "research" (in quotes) to support foregone conclusions or decisions.

However, there are times when a role in policy implementation is unavoidable. When this is the case, it is most useful to the office to involve as many outside people from existing line operations as possible in the implementation process--be they faculty or administrators. This may be less efficient from the standpoint of time, but will be the best guarantee of maintaining the objectivity and the image of the institutional research activity.

These remarks represent some of my beliefs and observations concerning what the role of institutional research ought to be in policy implementation. It will vary according to the organizational structure, the personal nature of the institutional leadership, the size of the institution, the nature of institutional control, and the particular background and characteristics of the incumbent institutional research officer.

It is my observation that in the area of policy formulation, implementation, and evaluation, the effectiveness and impact of the office of institutional research is dependent upon how well it perceives and maintains its proper relationship within the existing organizational structure, whatever that structure may be.

PART IV

THE ROLE OF INSTITUTIONAL RESEARCH IN THE EVALUATION OF POLICY

Presented by

Charles E. Howell, Director
Bureau of University Research
Northern Illinois University

Everett H. Hopkins, Vice President for
Planning and Institutional Studies
Duke University

James R. Montgomery
Director of Institutional Research
University of Tennessee

Charles E. Howell
Northern Illinois University

If institutional research is to have an effective role in the evaluation of policy, it follows that there must be a coherent and complete codification of the existing policies of the institution. Far too often a modification of one policy is made without reference to its effect on other policies. An institutional research office can therefore first of all serve a useful purpose by the simple collection and cross-indexing of all institutional policies. The idea is simple, although its carrying out is complex but not necessarily difficult.

When existing policies are to be evaluated, the implication is that they are to be re-examined to discover whether they are accomplishing what they were intended to accomplish. If they are not, why have they failed; and if they have failed, how may they have changed? As a matter of fact many, if not most, institutions will find in the process of codifying policy that they have a good deal of dead wood lying about which ought to be discarded lest it turn up to plague someone at a later date.

The evaluation of policy will start with a statement of the purpose for which the policy was adopted. This statement is basically of no concern to institutional research. However, when questions are raised as to the degree to which this purpose is being achieved, the problem becomes one for the research personnel, not the philosopher, to answer.

One or two illustrations may make the point clear. Institution "A" has an admissions policy which is based upon the premise that any graduate of an accredited high school is entitled to admission. However, classes are getting crowded, and budgets harder to come by. The question arises as to whether this policy should be changed. A careful analysis reveals that considerable numbers of students admitted under this policy are dropping out because of academic difficulties after one or two semesters. But, if it is to be changed, what will be the result if the lower one-third or the lower one-half of a high school class is denied admission? How many fewer students can be expected, what will be the effect on the retention rate, what redistribution of majors can be expected to result, and what will be the effect of staff load? All these and many others are research questions that need to be answered if any more than an arbitrary alteration is to be made in the admissions policy.

A similar kind of situation might arise in connection with the policy of probation and academic dismissals, of admissions into certain curricula at any level, or of any one of a hundred policies which might be cited.

If policy is to be evaluated at all, it must be evaluated in terms which are essentially in the institutional research category, whether this work is done in an organized bureau or elsewhere. Any other approach must necessarily be capricious and may alter a policy, which makes it in direct conflict with another, or makes it appear absurd when placed alongside another existing policy.

The fact should emerge quite clearly that no policy exists in strict isolation. Changes spread through the entire insititutional structure. Therefore, a centralized agency, familiar with all policies and able to bring information effectively to the authority which is to alter policy, would seem essential. Anything less will invite the kind of chaos which exists in many campuses.

Everett H. Hopkins
Duke University

In a three-way division of the subject of evaluation, my assignment is to consider (a) the extent to which objectives are met, and (b) the efficacy of the policies. The consideration of these two points necessarily assumes Dr. Howell's point that to evaluate policies there must be knowledge of what these policies are, and secondly, there must be an understanding of the purposes for which the policies have been established. (Parenthetically, I think we will agree that at least in the larger and more complex institutions, neither of these pre-evaluation conditions prevails--at least to the extent desirable for objective and meaningful evaluation.)

I will address myself later to the two topics assigned me, but before doing so, especially since the general theme of this conference is the conceptual framework for institutional research, I feel a compulsion to add my bit to the subject of the context within which institutional research can best be performed--not only institutional research as a basis for policy evaluation, but also for policy determination and implementation. If by institutional research we mean primarily applied research, formal or informal, engaged in purposefully for the advancement of the total institution, then the platform from which, and the context within which, an institution-wide program of research is conducted becomes especially important. It is, by its very nature, a "staff" or service function, and not a "line" function. To a far greater extent than with most other "staff" services within a college or university, the institutional researcher gets himself involved in the operational affairs--often delicate and sensitive matters--of nearly everyone else in the university, from the president on down. Therefore, unless the office of institutional research wins its own way, not only with the central administration but also with the deans and faculty, to the point where it becomes an integral and natural part of the internal operation of the university--both horizontally and vertically--and is truly welcomed by those responsible for line functions, it is doubtful if it justifies its own budgetary expenses or its own existence within the institution, regardless of how important we may happen to think the research findings are for the university.

If this general premise is correct, then several other points would seem to follow:

1. The prime mover and coordinator of the institutional research program will function best if his office is an adjuct of the president's office. Essentially, he is an "assistant to" the president--to help provide him and his central administrative officers with pertinent background information that will improve the quality of the administrative and policy decisions. He must, in fact, become an integral part of the central deliberative bodies (both faculty and administrative) if he is to be a genuine and productive partner in the enterprise.

2. The actual research studies are not made solely or exclusively by the staff of the office of institutional research. The staff of that office can provide leadership and catalytic effects. However, conditions and understandings must be established throughout the institution that here is an office that has no axes to grind, that can work harmoniously with any department or division of the university, and that is concerned objectively and helpfully with all sorts

of problems of institutional advancement. At this point, I should like to agree wholeheartedly with Sam Baskin in emphasizing the importance of working with faculty committees (and faculty members generally) in helping to advance knowledge, understanding, and concern about teaching and learning in specific relation to the institution's educational objectives.

3. Given the first two propositions, one can see that the most effective program of institutional research is not a highly centralized one, but rather a program which permeates the entire university. Here, I see no real conflict in the positions taken by Stuart Grout and Robert Hubbard on Sunday evening. True, they were different positions, but they are not in conflict. Certainly there is need for a coordinating office of institutional research, as well as need for a great deal of research that will not be conducted by the administrators of the operational programs, or by faculty committees. There is need for thinking time and for a kind of inactive leadership that will not normally be provided by others.

   On the other hand, what could be better than an institutional philosophy which places emphasis on continuous, institution-wide self-study, with an office of institutional research aiding, leading, and coordinating these efforts at every point. There is more institutional research to be performed in each of our institutions than any of our centralized offices can possibly perform, so why not encourage all other offices and divisions within the institution to engage in various aspects of the total task? What is important is that there be adequate internal coordination and communication.

It is my contention that some such context or conceptual framework as the foregoing must be established before an office of institutional research can expect to perform effectively either a catalytic or leadership role in the broad area of institutional evaluation.

I would add that the internal relationships and conditions I have described are not always easy to bring about. Colleges and universities generally have not been run this way. Traditionally, and I think healthily, college and university administrators (both up and down the hierarchy) have enjoyed and expect to enjoy a fairly high degree of administrative freedom; and in most institutions, particularly the larger and more complex ones, there seems to be some confusion between academic freedom on the one hand and administrative freedom on the other, which of course puts a high premium on genuine organizational leadership at the level of the presidency. If this leadership exists, if the president believes in an administrative philosophy which places an appropriate value on the results of valid and pertinent institutional research on a continuing basis, and if the office operates within the foregoing context, the value of its role can hardly be overestimated.

Now, what about the role of the office of institutional research in internal evaluation? To what extent are the institutional (and policy) objectives being met? And, what about the efficiency of the policies? Internal evaluation is not only a legitimate function of an office of institutional research but it is a necessary one. In fact the role of the office in helping to discern, establish, and implement policies would be weakened considerably if systematic and objective evaluation were not to follow. It would seem that the evaluation function is the function that completes the circle, because it is upon the results of policy evaluation that new or revised policies become discerned, established, modified, or implemented--and then again evaluated. However, I am not at all certain that these various functions of institutional research are that easily separated. When one begins to conduct research to help in policy formulation, he is to some extent inevitably assessing the value of existing policies--or the lack of them. Therefore, while I find it valuable to think of the role of institutional research in evaluation, it is difficult to isolate this role from all of the others of which we have been talking for the past two days.

In this connection Paul Dressel speaks of the "inevitability of evaluation." If by evaluation we mean judging the worth of a policy, a procedure, a program, or even of an experience or an idea, then this certainly takes place every day on every campus, by every office, and by every professor. The point is that we have seldom applied the standards, criteria, or research design to the evaluation of institutional policies and practices that the researchers in the disciplines apply in their own disciplinary research, which of course raises the whole question of criteria, a big subject for another paper or for the group discussion to follow. It is commonplace to cite the tendencies of even research scholars to hold and to express strong but highly subjective opinions on matters outside their own fields of competence. It is also commonplace to cite the tremendous resistance to change of college faculties generally, especially when the matter under consideration relates to teaching methods or curricula.

In view of the inherent nature of colleges and universities, and especially their faculties, I submit that we should not expect widespread immediate, or spectacular, results in the area of policy and program evaluation. However, in the long run, if the proper internal climate is established, if an outstanding reputation for quality in institutional research in gradually built-up and confidence established, and if both administrators and faculty are constructively involved in the processes, then the evaluation role of the office of institutional research is perhaps its most important role.

All that I have said in this regard relates equally to the five areas of policy singled out for special consideration in this conference, namely: (1) whom the institution shall serve; (2) type of faculty sought; (3) means of financial support; (4) the building of facilities; and (5) the curriculum. However, these areas are the subjects for our group discussions, and I hope that the problem of criteria and standards for evaluation studies in these areas will receive attention.

James R. Montgomery
University of Tennessee

Evaluations of policies and programs take place, without doubt, everywhere there is an institutional research function performed. Out of approximately twenty-five studies, ranging from small to fairly complex, conducted by the Office of Institutional Research in the University of Tennessee this past year, six might be considered evaluative studies.

In approaching this topic I want to consider first some of the techniques and problems involved in reducing policies or programs to a form which can be measured. Some years ago John Morris, then Director of Institutional Research at the University of Mississippi, observed that one should obtain two pieces of information before starting a survey: a statement of the purpose of the survey, and an agreement that the type of information supplied will be acceptable as an answer.[1]

After trying other approaches, I have concluded that Morris is correct. As time has permitted during this past year, the Office of Institutional Research at the University of Tennessee has been collecting a few figures about the faculty such as salaries, ranks, and median ages. Before starting the survey on median age, I drew up some tentative forms and submitted them to the vice president requesting such information. He observed that two of the three forms would really not tell him anything, but that the third form seemed well suited to his needs. This brief trip accomplished two things: (1) it indicated that one report would be sufficient for the uses of this vice president, and (2) that he still wanted the information. I am neither suggesting that it is necessary to have someone approve every table and step in the gathering and reporting process nor saying that one should find the exact answer needed in order to supply the approved solution, but it is necessary to be certain that the things one is finding have a close relation to the problems needing study.

Assuming one can obtain a statement on the information wanted, there still is a problem of entering into studies for which there are answers. All of you are aware of such studies; for example, which is best, the quarter or the semester system? The fact that "x" number of schools have it one way and "y" number another way does not tell much; neither does the fact that the members of the faculty have different opinions on the subject. A better, although still probably useless, survey of the merits of a semester versus quarter system might be to look at financial costs, student attrition in the two systems, academic knowledge gained, number of library books circulated in two systems, and other such information. Even then, assuming it possible to find such answers, one might not supply information which would have any influence on the system adopted.

In evaluation studies it frequently evolves that one must find by some process the policies or objectives which apply, for they are seldom written and when they appear at all, are sufficiently general to assure misunderstanding. Another problem is that the persons wanting a study may fail to state either by error or by design what they really want or expect. Finally, one attempts to translate the objectives obtained into questions or hypotheses which can be measured.

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[1] John B. Morris, "Space Utilization Surveys in Small Institutions," in Richard G. Ast and Hall T. Sprague, ed., College Self Study (mimeographed, Western Interstate Commission for Higher Education, 1959).

For most of the remainder of this paper, I want to discuss evaluative studies as they relate to the University of Tennessee. The studies reported to you are intended to generate ideas on evaluative studies which might be made, and are not intended as classics.

Self-Study Evaluations

One of the most far-reaching and important evaluative surveys conducted at the University of Tennessee has been a self-study. In spite of inherent difficulties in such undertakings such as numerous narcissistic platitudes, these studies do have merit. Techniques and procedures for conducting self-studies have been discussed in previous Institutional Research Forums; therefore, I will only comment on one of the reviews undertaken in connection with the self-study of the University of Tennessee.

The self-study called for a detailed study of the Tennessee School of Religion, a separately incorporated school affiliated with the University, in order that recommendations might be made for future policy on the teaching of courses in religion. In order to evaluate the school, several researchers collected information to answer the following questions:

1. Should a state university offer courses in religion, and, if so, what type of courses?
2. How did grading practices in courses in religion compare with other similar disciplines?
3. What attitudes did the student have toward courses in religion and other college courses?
4. What was the nature of course content, course objectives, and textbooks?
5. What administrative and faculty organization existed, and what should exist?
6. How were classes conducted from the standpoint of attendance by the teachers and the students, prayers given, and similar topics?

This survey was made by interviewing students and members of the faculty, making statistical studies on grade distributions, reading textbooks, and reviewing literature on the topic. The survey, in my opinion, is a good one and will doubtless have far-reaching results in the University.[2]

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[2] The results of this survey will be released at a later time.

Evaluations in Curricular Matters

In the winter and spring of 1963, the Assistant Academic Vice President made plans to conduct a large-sized summer quarter which had been approved by the President and the Board of Trustees. While the University of Tennessee had previously operated on a four-quarter system, the new plans called for an enlarged offering of courses, more faculty, and increased pay for summer teaching. The Assistant Academic Vice President wanted to evaluate this enlarged summer quarter. In planning the survey we determined to review enrollment increases and to distribute a questionnaire to students enrolling in the fall quarter of 1963 which would seek their reactions to the summer quarter if they attended, or, conversely, ask why they had not attended it. The questionnaire was modeled on one Joe Lins, Director of Institutional Studies at the University of Wisconsin, used a few years ago in a more elaborate survey.[3] We printed the questions on a data processing card which was collected during the fall quarter registration. The student checked certain responses, while other information was added from data already stored on each student. Answers to such questions as the following seemed pertinent:

1. Did enrollment increase in a significant manner?
2. Where should emphasis be placed in recruiting to increase the size of the summer quarter?
3. What scheduling difficulties did students have?
4. What improvements were needed in the summer quarter?
5. What reasons did students have for not attending the summer quarter?

In brief the survey disclosed that enrollment increased significantly, that scheduling problems were no more difficult than in other quarters except for certain graduate students, that the longer a student remained in school the more likely he was to attend the summer quarter, and that most students who had attended the past summer and had not graduated planned to return the following summer, while most students who had not attended the summer quarter did not plan to enroll in it.

In another survey in the general area of curricular evaluation, Gerald Whitlock, of the Industrial Management Department of the University of Tennessee, and I reviewed the effectiveness of pre-college courses in such fields as "How To Study," "Rapid Reading," "Remedial Mathematics," and Remedial English."[4] In this study we reasoned that considering the time the courses were offered, the group to whom they were offered, and the content, the objective was success in collegiate courses. In order to measure this objective, we selected a control group of students with characteristics like the sample group, collected academic results in college courses on each group, and performed a "t" test. The college grades of students enrolled in such courses when compared with a control group indicated that the courses either failed to help or even hurt the individual concerned. While these same courses are still offered in the University, publicity concerning them is not as enthusiastic as formerly.

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[3] L. J. Lins, "Student Reactions to 1961 Summer Sessions at the University of Wisconsin, Madison Campus" (mimeographed, University of Wisconsin, 1962).

[4] This research has been published under the title "College Preparatory Course Work," in L. J. Lins, ed., Basis for Decision, Journal of Experimental Education, XXXI, No. 2, 1962, pp. 188-90.

The Executive Dean of Student Affairs wondered what effect living on or off campus might have on the length of time a student remained in school and on his academic grades. He wanted information on whether or not rooming-boarding houses affected the academic performance of students occupying them.

In order to conduct this study, we collected information concerning housing, persistence in school, and grade point average on an entering freshman class over a four-year period. Then, in brief, we compared students dropping out as a function of place of residence, organizational membership, and sex and tested any differences obtained by use of Chi-Square analysis. If you are somewhat confused by this study, do not be alarmed, for we have not been able to simplify it sufficiently to write it up.

A rather quick and probably unproductive survey resulted from a request from the Assistant Dean of Admissions and Records to compare the academic accomplishment of international students enrolled in the Department of Civil Engineering with citizens of the United States. This survey probably failed to accomplish as much as it might have, for the researcher failed to talk with members of the Department of Civil Engineering in order to ascertain what was the purpose of the study. It developed that only students from India and China were numerous enough to be used in statistical tests. It was possible to compare by use of a "t" test each group of students with a random sample of native students. The survey showed that the students from one of these overseas countries achieved higher--but not to a significant extent--that native students, while the other country sent students who performed significantly poorer.

Another evaluative survey in the general area of student personnel management developed when one of the vice presidents asked how many high school students who came to the campus during various high school visitation days returned to enroll as freshmen. He wondered if the individuals being entertained actually enrolled. The survey revealed that about 20 per cent of the visitors entered. Immediate results followed. The Alumni Secretary, who coordinated the visitation program, reviewed his record-keeping system and found that he had missed recording the names of some of the individuals who had visited the campus, and he also found that many of the visitors were not seniors or even juniors. Consequently, the Alumni Secretary is now striving to get his alumni workers to bring only high school juniors and seniors. In addition, he has some material which allows him to ask his alumni workers what is happening to students who visit the university but do not elect to enter it.

The above examples are rather limited in the field of student personnel. Several people who work in the general area of institutional research such as

John Hills,[5] Warren Willingham,[6] or Clifford Wing,[7] are doing good work in evaluating admission policies and admission testing procedures.

Evaluation of Policies in Fiscal Affairs

Increases in the number of students and rising costs have led university administrators and state governmental officials to ask more and more questions concerning fiscal expenditures. The states of Florida, Indiana, and Texas, for example, use a formula approach in dividing state funds among institutions of higher education. Institutions in these states as well as in others, therefore, are collecting cost data in order to substantiate budget requests. The Universities Study,[8] of which John Swanson is director, is striving to find, if they exist, procedures and policies used in colleges and universities to allocate funds and to make cost analyses. Cost analyses play a part in the evaluation of policies. Since this subject is rather complex and has been discussed in previous forums, there are only two points I want to make concerning it: (1) Leroy Hull of Indiana University has just completed a publication directing the cost analyses system used by the state of Indiana, and (2) institutions making cost studies need to evaluate such studies from time to time in order to make certain that helpful and usable data are being obtained.

Policies related to capital construction projects are in the category of evaluative surveys since it is necessary to evaluate usage and needs before considering a new building. The typical space study frequently is limited to utilization of classrooms. Since little or no attention is paid to the number of faculty members and their offices or to bottlenecks resulting from scheduling difficulties in much-used demonstration classrooms or laboratories, critical space needs may not be pinpointed in space surveys, although the administration and the faculty involved are keenly aware that more room is needed. It does not always take an elaborate or complicated space study to find out that if enrollment is increasing by "x" numbers, and this increase will require "y" professors while there are only "z" number of vacant offices, that something needs to be done by someone regardless of whether there is 40 or 80 per cent utilization of general classrooms at 9:00 on Monday, Wednesday, and Friday. I am certain that we fail, or at least I fail, to supply the right evaluative material for good management decisions on whether or not to construct a given building or series of buildings. The result is that by some process a building is decreed, and then someone is asked to supply the justification. While elaborate cases can be made for such buildings, I still believe this is a reversing of the process. In summary, I am suggesting that the administration and the individuals supplying information need to join forces and arrive at some better questions to ask in order that more helpful data appear in space surveys.

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[5] John Hills, Director, Office of Testing and Guidance, Regents of the University System of Georgia.

[6] Warren Willingham, Director of Evaluation Studies, Georgia Institute of Technology.

[7] Clifford Wing, Director of Admissions, Tulane University.

[8] A national survey on terminology and procedures in fiscal matters.

Evaluation of Faculty Members

Evaluations of the faculty are hard to make, for it is frequently difficult to decide what to measure, much less how to do the study. Another complicating factor is that the research, when completed, is written off as the work of a madman or one who fails to know the "true" facts of the case, whatever that may mean. Teaching effectiveness, research production, standing in the academic world, or even descriptive information on degrees, ages, and colleges attended are items on which information is wanted.

Our administration and faculty endorse a policy of developing a better faculty. By expenditures of money and much hard work in recruitment and leadership, we have made efforts to effectuate this ideal. Here are a few of the ways we evaluate the success of our efforts:

1. By comparing increases in faculty pay with increases in similar institutions on a national level.
2. By comparing the number of faculty by degrees held by academic rank with earlier internal studies and also with other institutions.
3. By comparing median age of faculty members by college and rank with other institutions.

Normative data from the United States Office of Education, the National Education Association, and certain institutional research officers who have generously placed me on their mailing lists make such surveys possible. Although rather time consuming, such surveys on the faculty may help to locate potentially critical areas.

However, there are many other more elaborate studies possible. Gerald Whitlock of the University of Tennessee is currently experimenting with a teacher rating sheet which allows a student to grade the professor on an "A to F" scale and to respond to a series of 43 questions. He is now in the process of comparing each response checked with the "A to F" scale. Whitlock reports that a common denominator of "F" teachers is the response checked by students indicating that the teacher appeared unprepared. Whitlock is still at work on his survey. Galen Drewry, one of the discussion leaders in this Forum, has also attempted to evaluate teaching effectiveness as have many others.[9] Much work remains to be done in teaching evaluation.

In the University of Tennessee we have not tried to evaluate faculty research other than by counting output of published articles and books, a highly inadequate but widely used approach. If we evaluated research on the basis of publication in only the "leading" journals of a given academic field or on the number of times an article is cited by other authors, some interesting measures of research output might occur. Administration and fellow faculty members would probably welcome assistance in measuring research competency.

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[9] For example, see N. L. Gage, ed., Handbook of Research on Teaching (Rand McNally and Co., Chicago (c. 1963), Chapter VI, *et passim*.

Another field which might prove useful in evaluation of faculties is the measurement of public service functions or contributions in general to the university or college, community, or society. In addition, we often believe, based on some process of rating, that certain personnel fail to fill their positions adequately while others overflow their area; the result is a change in the organizational chart. Perhaps one of the discussion groups will come up with some ideas on the prediction of such behavior or measures of the effects of it on the institution.

In conclusion, one point cannot be overstressed concerning evaluative surveys. Unless policies and procedures are reduced to questions (or hypotheses) about which answers can be obtained, and unless the data collected are meaningful to the person who wants or needs the survey, evaluative studies are without value. Finally, I suggest that the work of the office of institutional research is itself a subject for evaluative study and that it is necessary to give attention to such a topic before a successor undertakes the job for you. Without doubt there are many types of evaluative surveys--good luck with yours!

PART V

THE ROLE OF INSTITUTIONAL RESEARCH IN THE ADMINISTRATIVE PROCESS

Presented by

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James I. Doi
New York University

My assignment for tonight, as described by our conference chairman, is "to more or less sum up or synthesize what has been described in the previous sessions, coming up with the speaker's own point of view"--in short, to present what sort of conceptual framework for institutional research has been "hammered out."

In pursuit of this mission, I have dutifully attended the general panel discussions, as have most of you, and listened with an open ear, a closed mouth, and hopefully a resonably unprejudiced mind. I must confess that with each testimonial of individual experience, preference, and point of view, I found it increasingly difficult to hold to an unprejudiced mind. Yet I think I made a valiant effort, for this morning I awoke unnerved and somewhat confused.

So it is with a feeling of uncertainty that I stand before you to present for your consideration a frame of reference for interpreting and, to some extent, for synthesizing the points of view, the concerns and issues expressed by the various speakers. I shall briefly sketch the major elements of this frame of reference, then proceed to the summarization and synthesis of that which I believe has been "hammered out," and finally indulge in the expression of a few of my own prejudices and observations regarding institutional research.

My frame of reference consists of the following which I shall state in the form of propositions:

Proposition 1: That there has occurred an evolution of institutions of higher education from small organizations which were relatively simple in structure and function, characterized by student bodies and faculties small enough to permit a high degree of interpersonal communication (that is, small enough to maintain a unified campus culture), and operating in a social order which made relatively few and simple demands on them, to large-scale, complex organizations which are striving to perform a multiplicity of functions, characterized by large student bodies and faculty populations, and operating in a social order that pushes and pulls them, imposes on and, at times, coerces them in manifold ways. In the course of this evolution from small to large organizations, institutions have come to resemble the classic bureaucracy in structure and mode of operation. (Having used the term "bureaucracy," let me hasten to say that I use it in a neutral sense--simply as a term used by sociologists to describe a formal organization characterized by clear-cut division of labor, a system of differential controls and sanctions stated in the form of rules and regulations, the assignment of roles to office-holders based on technical qualifications, impersonal orientation of contacts between officials and clients, and a structure of hierarchically arranged authority. The chief merit of such an organization, at least as Weber saw it, is technical efficiency.)

Proposition 2: That there is occurring in American higher education a change in the style of administration from the non-scientific to the scientific, the latter being characterized by the extensive use of knowledge as a basis for decision-making. (Gordon Tyndall, in his provocative paper, spoke on this phenomenon, so I shall not dwell on it further.)

Proposition 3: That the production of this knowledge, institutional research, has in many colleges and universities evolved from a form of organizational behavior characterized by sporadic studies and collections of data to a form of behavior characterized by coordinated and systematic review of research needed for institutional improvement and by the recognition of this process as a continuous, day-to-day function.

Proposition 4: That in many colleges and universities institutional research, which for years was performed sporadically by administrators, faculty members, and ad hoc study committees, has become a function of specialists--persons who are trained in research techniques applicable to studies of institutional operations and who by virtue of their expertise are appointed to and accorded a distinctive place in the organizational hierarchy.

Proposition 5: That these specialists, collectively, are becoming a distinct professional group consisting of persons with a colleagial sense of identity with others engaged in the performance of comparable services and who share with one another concerns over the identification and development of a specific body of expert knowledge, guide-lines for professional conduct, etc. (This conference itself is symbolic of the recent emergence of a rather substantial body of specialists who talk and worry like professionals.)

Before attempting to use these five propositions as a frame of reference for integrating and synthesizing the various points of view and concerns expressed in this conference, I would like to take a moment to comment on the significance of the order of these five propositions and my choice of certain terms. Let me restate briefly the five propositions: 1) the evolution of institutions of higher education from small, relatively simple organizations to large-scale, complex organizations essentially bureaucratic in structure and mode of operation; 2) the emergence of a new style of administration, which for lack of intellectual energy to search for a better term, I have described as scientific; 3) the evolution of institutional research as a form of organizational behavior characterized by sporadic studies and collections of data to that characterized by coordinated and systematic conduct of studies needed for institutional improvement; 4) the emergence of institutional research specialists; and 5) the professionalization of these men.

The order of these propositions is intended to suggest that each succeeding development is a consequence of the preceding development. The emergence of the IR specialist as a professional and as an office holder in the organizational hierarchy was dependent on the change in the nature of IR as a form of organization behavior. For this change to have occurred there had to take place a change in the style of administration. The evolution of this new style of administration is not only compatible with but a logical consequence of the evolution of institutions of higher education, especially the universities and large colleges, from small, relatively simple organizations to the large and complex.

There are two terms crucial to this frame of reference--"evolution" and "bureaucracy." My use of the term "evolution" may best be understood by my avoidance of the term "progress." Both connote change. But progress also connotes movement toward some ideal objective--an objective that is defined by a particular set of values. One may speak of evolution, however (i. e., change from the simple to the complex) without imputing value judgments.

I do not necessarily regard as progress the fact that today the dominant form of institution of higher education in the United States is the large, complex university or that a small institution in becoming large exhibits the characteristics of a bureaucracy. Nor do I take pleasure in suggesting that in order to appreciate fully the points of view, concerns, and issues expressed in this conference, we look upon ourselves as specialists operating in the context of bureaucratic organizations. But I believe I am speaking of facts of life--realities that have been amply reflected in the statements made by the various speakers.

Let me now proceed with the interpretation of what I believe I heard in the context of the frame of reference that I have just described.

The various speakers were in complete accord on institutional research as a staff, and not a line function. They were also agreed that institutional research should engage in the evaluation of policy. Since evaluation as a process generally involves studies and research, the speakers appeared confident of the role of IR in performing this function. There were also consensus on the role of IR in the formulation and implementation of policy--specifically that it does not, rather should not, directly formulate or implement policy. The role of IR is apparently to engage in various studies and analyses designed to produce information that will assist line officers and policy-makers in the execution of their tasks.

Given such a high degree of consensus on the role of IR in the formulation, implementation, and evaluation of policy, it would seem that we have indeed hammered out important guidelines and can tomorrow return home and perform our role with great confidence. Yet the climate of this conference does not strike me as one of confidence. I am tempted to suggest as an appropriate title for the proceedings of this conference the following: "The Proceedings of an Emerging Profession--Nervous of Its Status, Uncertain of Its Role, and at Variance on Style of Operation."

Specifically, I refer to the fact that while the conference topics suggested discussions of the generalized role of IR, much of what was said dealt with questions of the status of the director of IR in the institutional hierarchy, his role, and the style of operation.

In regard to status, several of the speakers stressed the importance of reporting to a line officer at the top of the administrative hierarchy--the president himself. Others seem content to report to the vice president for academic affairs or the provost. But these are only two of many places in the hierarchy where IR men (and women) are located. Furthermore, the titles vary--director, coordinator, administrative assistant, assistant to the president, dean, assistant provost, etc.

In regard to role, what the IR director does in his relationship with others, it is obvious that one must look beyond general descriptions of functions such as "to perform studies," and "to assist." Some IR men take the point of view that like Sergeant Friday of that once-popular TV show "Dragnet," they search for and report only the facts. Judgment is for the "judge and jury, ma'm." Others like Sam Baskin of Antioch College take a more aggressive role. They regard themselves as active "agents for change." They not only gather facts, but they also influence, persuade, cajole, and perhaps at times find themselves threatening. And still others seem able to perform the role of a court Rasputin. I once heard it said of a director of IR that his president won't make a decision about the university without first consulting him.

One also finds that in some institutions the office of institutional research is primarily project-oriented--that is engaged only in studies that are requested of it by other offices and committees. It is not unusual for such an office of institutional research to limit itself to a rather narrow range of studies--for example, the collection of data relating only to class size and teaching loads or the analyses of enrollments and student characteristics. In other instances, the office of institutional research stresses the institution-wide coordination of internal studies and the identification of areas that require study. Such an office also undertakes studies on its own, but, generally speaking, attempts to limit them to types which can best be done by a central agency rather than by the operating units.

How can one account for these variations in status, role, and orientation?

The single, most important factor underlying these variations, I believe, is the degree to which an institution is committed to the new style of administration. This new style, as previously stated, is characterized by reliance on knowledge as a basis for decision-making. Where there is a high degree of commitment to the new style of administration, there will generally be found near or at the upper stratum of the administrative hierarchy, in one form or another, an office of institutional research which both coordinates and directly engages in IR projects. Where there is a low degree of commitment, there will be found an office of institutional research, or something approximating it, that is project-oriented and that has little or no responsibility for coordination and continuous review of needed research.

While each of us has his pet views on specific administrative arrangements--that is, whether the IR director should report to the president or to a vice president, or whether he should be called dean, director, or coordinator--the importance attached to IR as an organizational function is related to the style of administration. This relationship suggests that the use made of an office of IR can be expected to vary with changes in key administrative officers. One cannot assume that all men who gravitate to presidencies and vice presidencies know how to use an office of IR or want to rely on its services. There are still men who, as key administrators, believe in attaining institutional objectives by means of dead reckoning, who attempt to pilot the ship with the daring and courage of old-time aviators. The future of institutional research lies with the increasing number of administrators and faculty groups who look upon a modern institution of higher education as a complex, fast-moving ship flying in congested airlanes.

Before leaving the subject of things discussed in this conference, I should be remiss if I were not to attend to the question of whether an office of IR should be administration-oriented, faculty-oriented, or student-oriented. Generally speaking, institutional research as an organizational function has been and continues to be administration-oriented. But here again, I return to what is implicit in my frame of reference--namely, that total institutional commitment on the part of both faculty and administration to the use of knowledge as the basis for decision-making has yet to evolve. As has been often observed, faculties are basically conservative on matters pertaining to institutional change. An office of IR is perceived by many faculty members as another unnecessary appendage to the administrative bureaucracy. Moreover, the use that IR so often makes of data processing equipment and procedures tends to reinforce faculty fears that it may be just another development contributing to depersonalization.

Thus far, I have spoken of IR particularly in terms of manifest functions, that which we believe and say to be its role in institutional decision-making. I have tended to impute to these manifest functions positive values. The coordination and conduct of studies, the identification of areas for study, the instigation of changes, and various forms of assistance rendered to administrative officers, faculty, and student groups are things we say we should do in the belief that they contribute to organizational efficiency. Now let me turn to the question of malfunctions--things that might happen to reduce the effectiveness of the office of IR. I shall limit my comments to those things which are directly controllable by the director of institutional research.

The first that comes to mind is the IR man who starts as a specialist in the design and execution of a limited range of studies and continues to be merely just that, usually by failing to extend his competency in research techniques and his comprehension of colleges and universities. This, more than any other single factor, can lead to his becoming a mere bureaucratic appendate. Not infrequently an institution will appoint as IR director an individual with competency in certain kinds of studies that are of immediate interest to it--for example, budget analysis and cost studies, or enrollment projections and student characteristics, or curriculum analysis and educational experimentation. Within a two- or three-year period, studies of a given type should become a matter of routine and the institution reasonably well informed of the situations encompassed by them. Other problems in other areas requiring analysis may then come to the forefront. The director of IR should be able to provide the knowledge and leadership in the study of such other problems; if not, the administration will have no other recourse but to regard the office of IR as a repository of more or less routine, perhaps even unimportant, studies. By knowledge and leadership, I do not mean that the IR director should seek to become an expert in every type of institutional studies. While the attempt to become such a complete expert is admirable, I doubt that achievement is possible. As a minimum, however, he should acquire knowledge of the kinds of studies developed by others engaged in research on higher education and of their relevance and applicability to the problems faced by his institution, so that he can, through staff appointments, by appeal to faculty members interested in participating in various types of institutional research, and through judicious use of consulting experts, get the job done.

A second way in which an IR office may malfunction is for its director to use information gained from the studies as an instrument for extending personal control over administrative areas or for solidifying his status in the administrative hierarchy. He must undertake studies, but of equal importance is that he disseminate the findings to appropriate persons within the institution. His function is not to spring surprise information parties at the conference table, or to be so secretive about his work that his administrative colleagues begin to feel that he knows something about their operations that they don't know. Within four or five years in a given institution, a director of IR is likely to have at his command a wealth of data about practically all aspects of the place. If there occur during that period changes in administrative posts, he should be available to play an important role in familiarizing incoming officers with the institution. The director of IR, above all others, should resist any temptation to put a new man in his place by displaying, at the conference table, uncommon knowledge about the latter's domain.

Another form of malfunction, one which has been frequently cited in this conference, is for the director of IR to attempt to implement policy while still assigned to IR. There are two common manifestations of this. One is the IR director who forgets that his role is staff and not line and attempts to take over the line officer's area. This requires no further comment. The other, which is surprisingly common, is the man who wears two hats--one line and the other staff--for example, the man with the title "assistant provost and director of institutional research." I myself once committed this sin, and while there may be persons sufficiently adroit to balance both hats, I must confess that in the time I attempted the feat, institutional research suffered. Here I am referring, of course, not to the IR director whose status has been enhanced by an additional title, but to the person who has been assigned critical line functions (i. e., decisions regarding promotions, appointments, fund distribution, etc.) in addition to the staff functions of IR. Quite aside from the difficulties of attempting two jobs, which are readily imaginable, the objectivity of the IR efforts is likely to come under attack. Is the man manipulating the data so as to make his decisions look right? Is he using the office of IR to study primarily those topics which are of immediate concern to him in his line capacity, ignoring the informational needs of other officers?

Another form of malfunctioning occurs when a director of institutional research gives in to the urge to undertake a project that interests him mightily but which, at the same time, is likely to be disruptive of institutional morale or to aggravate an already unhappy situation of institutional anxiety. An institution, during any given period, is willing to subject itself to certain kinds of studies but not to others. A director of IR must be able to sense these organizational moods, speedily to put a halt to a proposed study, and just as readily prepare for another on his agenda of "things to get done" which is more tolerable to the institution. For example, the faculty morale study which John Dale Russell undertook several years at New York University could have been attempted at the University of Colorado in 1960 but not in 1963. A questionnaire asking faculty members to report annual income from consulting and similar extracurricular professional activities might be tolerated by the faculty of one university, but in another it would create a major furor. The function of IR is not to rock the boat, but to enable the steersman to set a wise course; if the search for navigational data might result in rocking the boat, the steersman should be so advised.

That the director of IR and his staff should assiduously observe the confidential nature of certain kinds of data and record to which they may have access goes almost without saying. Closely related to the breach of confidentiality is the publication of a study, the contents of which may be such as to cause embarrassment to the institution. Just as some institutions are able to tolerate certain kinds of studies which others are not, some institutions are better able than others to withstand having their "guts" revealed to the public. While Johnny Morris was Director of Institutional Research at the University of Mississippi, he used to say that the most interesting studies seldom see the light of day; they are usually discussed within the confines of the conference room, the findings acted upon but not widely disseminated. The post of director of IR requires the exercise of restraint of the urge to publish. One of the values of professional meetings of this kind is that it gives us a chance to exchange notes on the techniques and findings of our unpublishable studies, on a more less-confidential basis.

These observations on malfunctions, the five cited by no means being the only ones, are sufficient, I hope, to suggest that an office of institutional research is not an untarnishable creation. It is capable of malfunctioning, and the examples which I have noted are those which are directly controllable by an IR staff.

In the final section of this somewhat extemporaneous commentary, I would like to make a few observations on the development of an association of professional IR workers.

Institutional research has been characterized by great vitality in recent years. This vitality is manifested in the growing body of IR literature, a very substantial increase in the number of IR workers, and widespread recognition among college and university administrators of the need for and value of institutional research.

This afternoon we took an important step toward professionalization--the appointment of a constitution committee for the proposed association of IR workers. That such an association would one day come into being was predictable a few years ago. I see no point in attempting to resist it, as I did a year ago. I do urge, however, that the proposed association in its constitution and by-laws avoid restricting membership by a rigorous set of qualifications defining who is or who is not a professional IR worker. The current vitality of institutional research, I believe, stems in no small part from the very lack of an established norm of who is or who is not an IR man. Persons participating in this and previous forums represent many disciplines--economics, the behavioral sciences, business management, the natural sciences and mathematics, education, etc. Their titles vary; they come from colleges and universities, from governmental agencies, and state and regional coordinating agencies. This diversity may irritate some of us, and it probably contributes to the air of uncertainty as to what institutional research is, can be, and should be. Yet, I believe we should treasure this diversity and retain it in the proposed association so that we may continue to reap the contribution it makes to the vitality of institutional research as a force for improvement of our colleges and universities.

PART VI

NEW TECHNIQUES IN INSTITUTIONAL RESEARCH

Presented by

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The Modern Information Explosion

University and college officers have the increasingly difficult task of controlling their expanding institutions. This is because the educational institution, like most other organizations, is feeling the effects of the information explosion--the creation of more and more information about more and more things. Students are seeking information that is constantly changing to keep up with the technical and social changes in our rapidly developing civilization. The ability to use information of all kinds with great efficiency and flexibility is central to controlling educational institutions under these circumstances.

To cope with their new problems, the university and college officers need new concepts of information processing. These new concepts require advanced data processing techniques, advanced analytical tools, and new organizational structures. One new concept of university and college administration which has promise of being a significant help is the IBM University and College Information System (UCIS)--a framework which each institution can modify to create a management control system which will help those in charge solve today's problems and plan for tomorrow's needs.

The IBM University and College Information System evolved from a total approach to the informational needs of all elements of the insitution. Therefore, the system requires the support and coordination of top-level officers. These officers will be rewarded for their efforts by having at their fingertips better information for decision-making than would be possible through any lesser system.

The Scope of the University and College Information System

The IBM University and College Information System relates to all elements of the university and college administration and is divided into three major areas: Student records, financial administration, and planning and development.

1. Student Records

This area deals with applicants, students, and alumni. The ultimate student record system would begin when a student first enters elementary school and end with his decease. Some educators have called this a "cradle to the grave" approach. Short of this idea an individual institution can organize its own system of student information into a total approach.

The concept of UCIS is to establish an individual master record for each student, in electronic form, as a result of the admissions process. This record will be added to and drawn from by the other functions of testing and counseling, registration and recording, student services, and alumni records. In addition to serving all parts of the student record system, the student master record will provide current and complete information for the benefit of such financial operations as student loan accounting and all the student data needs of planning and development.

2. Financial Administration

This area deals with personnel, material, facilities, and funds. In recent years, industrial organizations which have similar problems in these areas have developed a number of new management techniques. The UCIS goal is to apply these new ideas to the similar problems of educational institutions. There are two general types of operation in financial administration: accounting and control.

Accounting operations have definite deadlines and widespread external demand, and deal with dollars and budgets. Functions which have accounting as a primary concern are student accounting, payroll, personnel management, income accounting, and general accounting. The concept of UCIS is to establish a single master account record in electronic form that is used to serve all departments of the institution. This master record would consolidate all accounts, including budgetary and cost control accounts.

Control operations primarily have internal demand. Control deals with units and rates. Functions which have control as a primary concern are purchasing and material management, plant and equipment management, and investment management. The concept of UCIS is to establish control records wherever the master student and master account records prove incapable of supplying the needed information. For example, inventory control information should be in item number sequence, while the inventory account record should be in a sequence relating to department and fund numbers.

As physical plants expand to meet enrollment increases, new types of facilities are developed to serve new needs. As financing gets more complicated, the administrator increasingly will need to use better control techniques in the area of financial administration.

3. Planning and Development

The newest of the three UCIS areas, planning and development, deals with studying the institution's problems, planning for the future, and developing ways to finance the plans. These functions are becoming the most critical in all of administration. The degree to which they are interrelated and built upon the two operating areas, student records and financial administration, will determine the effectiveness of this area.

Institutional studies or research have become vital to the determination of costs of instruction, allocation of faculty effort, allocation of space and other resources, estimation of enrollments, and other facts about the institution's past, present, and likely future. For state-supported institutions the growth of the planning and development area was initiated by legislative requests. However, mounting operating and construction costs, longer material and building lead times, and expanding sources of funds make it apparent that all universities and colleges need an effective planning and development activity for their own internal control.

Planning involves projecting the resource needs of the institution into the near and intermediate future. The short-range plans will shape and justify the next budget. The intermediate plans may affect the entire nature of the institution. Such basic and important activity must be directed with the aid of the best possible information; this means not only the collection and display of a wide array of facts, but also the analysis of these facts as they relate to the future. Perhaps one of the most powerful single uses of the computer is its ability to simulate human situations and predict the future. Simulation means the ability to approximate the effects of various alternative courses of action without the cost of actually taking any of these actions. It has been applied to aircraft and missile design for years. It is now receiving widespread interest in industry and has great potential for education.

Development of funds is an activity that must be given meaning by the personal efforts of the chief executive. It is becoming more important to augment the chief executive's skill and intuition with more exhaustive analyses of the needs for funds. This function is that of translating the adopted plans and their costs into income sources. As the income sources prove to be greater or lesser than estimated and as the nature of the educational environment changes, plans may need to be changed.

4. Central to the above three is a modern data processing installation which is used for processing all the information. The electronic data processing system has, perhaps, its greatest payoff in the planning and development area. It offers two major capabilities: (1) the ability to process large bodies of information, and (2) the ability logically to analyze this information as an extension of man's thinking processes.

The University and College Information System brings the officer into contact with all pertinent activities of the on-going enterprise as these activities occur. The officer gets a picture of the exceptional situation that needs his immediate attention. He can ask for rearrangements of the same information and get them promptly. He can expect new kinds of information brought about by newly interrelated records from all over the campus. He can have a laboratory for experimentation before committing himself to costly programs.

Let me make a few general data processing comments, and then see how they affect the UCIS concept and ultimately people in institutional research.

1. Raw data in file folders in file cabinets is essentially useless for research purposes.

2. If data is to be used only once, don't bother to put it into a form suitable for machine processing. However, who can prejudge data this way? Thus, only the exceptional data will not be changed for machine processing.

3. For simple efficiency, data to be used more than once should be put in a form for machine processing as early as possible, eliminating the duplication of clerical effort.

4. Suitable forms for machine processing mean that information is recorded on IBM cards for punching or machine reading. Wherever possible, a document should be used for machine re-entry. As an example, type readers are in the laboratories today and will be practical in the not-too-distant future for some applications.

5. Let me distinguish between clerical and management data processing application by using as an example, listings versus analytical reports.

6. The number one function of an educational institution is to educate students and faculty. More effort and attention should be directed

toward education and the improvement of the educational process. The use of data processing can assist in these efforts. With the foregoing in mind, let me repeat the concept of UCIS showing how each section ties into institutional research.

Student Personnel Administration

Each student is a complete person; therefore, his record should be a complete record because many departments or activities will contribute information to build up his cumulative student record. Likewise, many departments will wish to have access to this record for whatever part they play in assisting the student during his academic career. Some--the academic advisor, for example--will want information about just one student. Others will want information for many students for management analysis. This type of information has usually been very sketchy and difficult to obtain.

Now is the time for the student personnel administration to take a completely new look at the information handling which has to be done. It should be analyzed as one system in the light of the complete job which should be done, utilizing modern data processing technology with all its capabilities.

Secondary school officials are now talking quite seriously about standardizing student records. Statewide education systems of junior colleges, state colleges, and universities are seeing the need for and are developing standardized information as students transfer from one institution to another. The interest of national education agencies in consistent student data for planning purposes is another reason why more and more educators are looking at the processing of student records from a total system's basis.

A student's master record should be started in the admissions office. The information should be put in punched card form at the earliest possible moment. The IBM data processing installation, even at this early time, can perform many valuable functions, such as editing and calling attention to and even writing a form letter for missing items needed to complete an application.

The information on applicants usually comes during a short time each year causing high peakloads of clerical-type work. Data processing equipment can help reduce time lags during such peak periods.

It is estimated that some 50 per cent to 90 per cent of the applications, according to a set of rules, will be either clearly accepted or declined. Machines can do this kind of preliminary screening, saving the difficult cases for personal attention. Lists of acceptances and rejections can be printed with the reasons for the action taken so that personnel can make a quick proof check before official action is taken.

At the same time that individual applications are processed, the IBM EDP system can produce daily or weekly statistics on applications which can be compared against objectives to guide official action. For example, officials may have specific objectives for the geographic spread of out-of-state or foreign students, alumni vs. non-alumni relations, particular colleges or curriculum enrollment maxima, per cent of men or women students, availability of scholarships or loans, dormitory space, academic standing, and many other items. Quick information about any or all of these will be of considerable aid to officials making the decisions for admissions. Such information is a relatively simple machine by-product of the application process if the entire application is put into the data processing system from the very beginning.

Quite a few schools are doing extensive analysis of applicant information. They are able to give relative values to the same apparent grade level from different schools based on past performance of the students. From this and other information they are then able to make fairly accurate predictions on first-year academic performance of students.

Once an applicant is accepted, the IBM UCIS can automatically start him on the next steps toward class registration, start the action chain for the financial area including fees, loans and scholarships, start the procedure for other services, such as board and room, medical and testing--all without people having to duplicate information already in machine form.

Many colleges already use IBM computers to do the actual student scheduling function. Procedures are being improved to make the results of such an operation as efficient as possible with respect to costs, facilities, and faculty requirements.

Testing and counseling are important functions before and after admission to college level work, and a thorough analysis of a test is an easy task for the IBM system. The testing process should mean far more than just counting right or wrong answers. The results can provide a great deal of information about student performance, the value of test questions and the effectiveness of the teaching process. This kind of information can be used to help the individual student improve himself. It can help the institution improve its educational function.

As testing and analysis procedures are improved through the use of data processing procedures, counseling procedures can become more effective in guiding a student toward his educational objectives.

During the school year the IBM UCIS can greatly reduce the clerical work in connection with grade reporting, and from that task, do several editing jobs. It can uatomatically produce honor lists and call for assistance to help those in academic difficulty. Editing can also check on individual progress toward degree requirements, as early as the first day of classes, so as to prevent embarrassment caused when an error is found to late to allow a change which would permit graduation as expected.

When the question of job placement comes up before graduation, good records and counseling are important. The IBM UCIS can provide the complete records to assist the counselor. Also, the system can provide lists of students to match interests of employers and thus keep each person in contact with the most suitable job opportunities.

After a student graduates, it is important to keep in touch with him as an alumnus. From a long-range research basis, the correlation of school record and later performance can help the institution evaluate and improve its education and counseling operations. The institution may provide employment service in later years, too, thus continuing its service to alumni.

Many schools are counting more and more heavily on alumni for both financial and influential support. Complete current alumni records in the IBM UCIS can quickly provide lists in a variety of sequences, do gift analysis, and help in many aspects of communication with alumni.

Financial Administration

The area of financial administration is composed of functions dealing with personnel, facilities, material, and funds. These functions, more than others associated with education, closely resemble functions in commercial enterprise and can benefit from the management tools and concepts developed and already proven useful in industry.

Performance budgeting, internal operation costs, rates of use or rates of change are the kinds of information which are useful for control purposes. Ideally, control information would be available at any instant. Practically, a compromise has to be reached so that the information does not cost more to get than it is worth. Indeed, it should cost appreciably less than the value placed on it by management.

The demands of the financial administration can be met through the use of the IBM UCIS and its ability to accept, store, process, and display information in almost any conceivable combination of ways. However, the demands can be met only if the entire operation is planned as a complete coordinated system, rather than as a collection of somewhat related functions. A few of the typical sub-systems applications in the financial area are given in the following paragraphs.

The use of a good manpower skills inventory system can give management a quick source of names of people who might fit any specific personnel assignment. The ability of the IBM equipment to match job and personnel profiles can produce quick action and allow better personnel operations, thus improving morale. Since the payroll is probably the largest single expense item for the institution, good personnel operations through effective information procedures can be of considerable assistance in smooth operation of all facets of the institution.

A purchasing operation with highly coordinated information about inventory levels, minimum economic ordering quantities, accounts payable, receipts and check writing can save money in material costs, inventory space, and outside good will. All of the above operations can be a fast, highly automated procedure. The analyses of vendor operations, inventories, and budget expenditure relationships are additional benefits available from a well-planned administrative system.

The maintenance of plant and equipment for an institution is probably the largest non-academic department of most educational institutions. Good control of costs and job schedules is greatly facilitated through the use of information available as part of the IBM UCIS. Preventive maintenance is facilitated by the system, but even emergency repairs can be expedited by the availability of fast, accurate information. This may be through simple reference information, or extensive information retrieval of engineering drawings, plans, and charts by machine procedures.

The control of one-time projects can be greatly facilitated by the use of PERT and its critical path method operations. Here again the IBM equipment and programs can provide much information in a minimum time and thus expedite modern management control.

Routine scheduling of all equipment and facilities can be assisted through the use of the IBM installation. Multiple input devices linked to the data processing center through communication lines can keep central files up to date and prevent idle periods due to lack of current status information.

The funding of most educational institutions is now being done through a complicated and diverse combination of sources. The need for coordinating all contacts with these many sources requires more and more data handling and analysis which can be expedited through the use of the IBM installation. Adequate information can influence legislators or boards of trustees to see more clearly needs or benefits of a program. Investment analysis can be performed through the use of computer programs already available. Alumni drives can be organized for more efficient coverage and return through the use of well-mechanized record handling. Research contracts require detailed accounting and record keeping which can be facilitated through the use of the IBM UCIS. The foregoing comments are only an indication of the many reasons why the financial administration needs a well thought out information handling system and capable equipment in order to do its part in helping the educational institution meet its objectives.

Planning and Development Administration

Of the three general categories of administrative work described in the IBM UCIS, the planning and development area is the one most closely related to the chief administrator of a college or university. The use of data processing equipment can save some money and time in student and financial recordkeeping applications, but it has the potential for making by far the greatest contribution in the planning area.

It is rather strange that computers have found extensive use in scientific areas but that there has been almost no transfer of this knowledge and capability to the area of administrative planning on the same campus.

Too often, planning is a "made do" effort, handicapped by a lack of time, clerical effort, and information. Decisions are made on assumptions, estimates, and small samples which are often not very respresentative.

When the student and financial records are mechanized, all this information is easily available as an inexpensive by-produce for use as input to the planning operations. The kinds of reports generally desired are not simple lists from the past, but rather analyses showing trends, shifts, changes, utilization of facilities, etc. With the aid of this type of information, projections can be made as to what the most likely possibilities will be in the future.

A whole new technique is now available to assist the administrator. It is called simulation. It depends on mathematics and may be greatly aided by the use of a computer. Dr. Hendrix will have more to say about this, so my remarks will be very sketchy.

Scientists and engineers have used simulation techniques for years. Sometimes this takes the form of physical models such as scale models of an airplane in a wind tunnel. At other times the simulation is completely mathematical in the form of equations. An example of the latter is a simple accounting procedure. This simulates the flow of actual cash through a business but does it in terms of numbers, rather than the actual bills or coins.

Statistics from the past can give values and illustrate trends for such things as number of applicants, number of students, drop-out ratio, academic fields of interest, academic abilities, class sizes, faculty-student ratio, in-out of state student ratio, men-women ratio, cost per student per subject and level, area per subject per class, material costs, and many other relationships.

If the administration assumes the trends will continue, it is relatively simple to give quantitative values, for any desired time in the future, to such questions as: how many students, teachers, dormitory spaces, and classrooms are needed? What cost per student per course, what total costs, what operating costs in a wide variety of categories, etc. ?

Most administrations cannot assume that the future will contine the same as the past. They have to make assumptions that some rates will increase, others will decrease. They have to assume certain ceilings will exist at various times in such things as space, facilities, and finances. With a computer they can make the calculations to show the consequences of various decisions. The administration can virtually experiment with all aspects of operation which can be put into numeric form. Hundreds of combinations of factors may be examined to determine their effects without committing or risking any large outlays of money.

The IBM UCIS offers to the administration valuable information from which it can make well-informed decisions. Once a decision has been made, statistics should be available to keep a close check on the relation of the actual results and the expected results so that action may be taken quickly when anything deviates from the plan.

With the growth and changes in education coming as fast as they are, planning must be done better, quicker, and farther into the future than ever before. The IBM UCIS will provide the facility to do this. Machines will allow personal attention.

You people in institutional research should support the improved system concept of mechanizing student and financial record handling with modern data processing technology--high volume processing and output capabilities. This will provide you with both the information you need for your own work and the processing capability to do the research.

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Introduction

The primary purpose of this document is to present a rationale for research, administrative in nature, which permits analyses of the present and proposed activities of the various components of a system. These analyses will then permit the identification of decision situations and of solutions to these decisions which will maximize the over-all effectiveness of the educational system. The term "educational system" means any sufficiently autonomous and discrete educational institution, organization, or unit. It could be a university, a college, a junior college, a school district, a state school system, or an individual high school. The phrase "administrative research" is used to refer to the over-all process involved. More specifically, it means basic concepts and rationale behind the processes.

It will be apparent that these concepts have been borrowed from operations research as it has developed in business, industry, and the military but have been altered and adjusted so that they are applicable to educational enterprises. Thus, the phrase "administrative research" is used to avoid confusion with operations research.

Definition

Administrative research is broader in concept than what now is called institutional research and may actually utilize institutional research (making studies, gathering data, etc.) as a basis for arriving at decisions.

Administrative research is a process which involves the continuing use of a particular conceptual framework as a basis for arriving at decisions. This framework consists of the application of scientific methods to the process of defining objectives, assembling relevant data, and utilizing these in arriving at decisions which affect the achievement of the objectives.

Characteristics

Before proceeding with a formal presentation of the concept of administrative research, one must list some of the characteristics of administrative research. These can be either essential or nonessential. The essential characteristics are as follows:

1. Administrative research is concerned with the systems approach. It seeks to find the best decision for the total institution or operation. This may involve an increased achievement of some objectives and--upon occasion, in the interests of the total institution--a decreased achievement of others.

2. Administrative research is interdisciplinary in nature and lends itself to a team approach. A team may consist entirely of staff members from within an institution (particularly in a college, the faculty of which includes representatives of varied disciplines), entirely of experts from outside the institution, or of members from both within and without the institution. This organization permits, even encourages, the participation of faculty members from a wide

number of disciplinary areas to become involved in studies of their own institution, bringing to bear their own particular specialties on the institution's problems.

3. Administrative research aims to bring the most advanced available procedures to bear on the process of arriving at effective decisions. It aims to provide decision-makers with a scientific basis for arriving at decisions which involve the interaction of components of the institution in the best interests of the institution as a whole. Usually, models are devised to illustrate the interaction of factors affecting the achievement of objectives and the objectives themselves.

4. Any or all types of research (theoretical or applied, experimental or survey, literary or statistical) may be used to provide relevant data for the administrative research process.

Some nonessential characteristics might be:

1. Administrative research is, if it is being used at all, a continuous, as opposed to discontinuous or discrete, process. It involves the repeated and continuing examination of relevant facts during the process of study, and, hence, the frequent revision of objectives, methods of study, and procedures for applying results to the making of decisions. It is not a problem-solving device or a technique with which to meet emergencies or "put out fires, " although it would probably assist with such administrative tasks. Accordingly, the processes in administrative research cannot ordinarily be listed in sequence.

2. The basic tasks in administrative research are, in general terms, translating the problems of the decision-maker (in institution-wide terms) into research problems, assembling relevant data, and applying the findings to decisions.

3. Administrative research provides decision-makers with information by which they may assess the extent to which the many diverse objectives of the institution and its parts are achieved, and how the relative achievement of these objectives relate to the effectiveness of the institution as a whole. Effectiveness is ultimately determined on the basis of the relative value of the objectives and the extent to which they are achieved.

Assumptions

Several assumptions are necessary if administrative research is to be useful in educational systems. Some of these are as follows:

1. Only people have problems; problems do not exist unless there are people to be aware of them. In general, problems exist when someone wants something that he does not have, or feels that what he has is somehow lacking. When someone feels that he has a problem, and he is also required to find or develop a solution for the problem (i. e., he must find the "something else" or alleviate the "lacking"), he is usually called an administrator or decision-maker.

2. Another assumption which appears to be inherent in administrative research is that pure, theory-oriented research and split-second

> decision-making can be regarded as lying at opposite ends of a continuum. At points in between these extremes would lie such processes and procedures as institutional research, surveys, gathering of data for administrative use, and such behaviors as checking to see if a student whose last name is the same as the govenor of the state is actually the governor's relative before signing forms to have the student dismissed from the state university for dormitory rowdiness.

Much of the literature and research in the area of decision-making emphasizes administrative behavior. Typically, administrators are described as facing situations, problems, or questions which need immediate solution. The process, as studied, consists of the selection of alternatives based on knowledge already held or readily obtainable about the situation. In some treatments of the decision-making behavior of administrators, this process is represented as a series of yes-no decisions (3:165-188). One general fault which characterizes this concept is the atomistic view taken of the problem. Quite often, the organization, system, and the environment of the institution are apparently ignored. The simultaneous consideration of the total environment, with all of its objectives, problems, and possible solutions, is seldom considered. In fact, looking at the problem in this behavioristic manner one finds it extremely difficult to view the total system.

At the other end of this continuum, we might find the traditional classical view of research. This concept views research as originating from, contributing to, helping to alter and/or to reorganize theories, which, stated in general terms, attempt to explain for man his perception of his place in the universe. For example, in relation to educational matters, researchers have developed and are constantly testing certain theories which attempt to explain learning. A typical attitude expressed by administrators regards such research as useful and necessary, but not too "practical" for making decisions. Complexity, tentativeness of results, and other excuses are often used.

It is felt that administrative research might be able to coordinate and organize the processes and procedures that stretch over this continuum, so that the administrator and policy-makers can make more exact use of the entire range of research activities for decision-making.

3. In the first assumption it was stated that only people have problems. similarly, it may be assumed that objectives, and the relative values of objectives, do not exist unless there are people to value them. This assumption is indeed basic to all educational enterprises and prohibits administrative research from being mechanistic or dehumanizing. In fact decisions reached without this type of analysis are probably more mechanistic, since they can't take into consideration all the relevant values and elements in a situation.

4. Another assumption is that objectives must be stated in measurable terms. This is again basic to all educational endeavors, but usually does not characterize the objectives of the institutions as a whole. Any catalog statement of institutional objectives bears mute evidence to this fact, since in nearly all cases they are not measurable, and in most cases are meaningless.

Elmer West, speaking at the Forum on Institutional Research at the 1963 convention of the American Association of Junior Colleges, recognized this problem. He states, referring particularly to junior colleges:

> "Lets start with the 'why?' of the institution itself. This is not necessarily a problem for institutional research, but it is preliminary to institutional research and is a problem for administrative research. Unless the situation has clearly stated objectives, it has no way of determining its progress toward those objectives. Furthermore, those objectives must be stated with clarity and conciseness, and with a reasonable relationship to potential accomplishment, if they are to be researchable. A community college cannot, for example, give as its purpose 'service to the community' without delimiting its service so as to exclude fire and protection, street repair, transportation, and other services to the community. The situation may resemble that of the man who had learned numbers, but not how to read; when he came to the sign post he could tell how far away he was, but not what he was away from. The first step, then, is to ask 'why' and see that an answer is given in reasonable, objective terms. Although this should precede institutional research as a practical matter, it may, in some instances, be the first task of institutional research.
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> "Activity and achievement are not synonymous; the latter presupposes some point of departure and an objective. In the junior college field objectives may not be less clearly stated or more confused than in other components of higher education, but they may appear to be because of the focus of attention on them today. For this reason, there is perhaps even greater need to emphasize the necessity for clear objectives as a basis for goal-directed institutional research in the junior college.
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> "Once the aims are clearly established, the programs--offered or needed--to accomplish the objectives may then be studied. Education in this country seems to pride itself on its diversity. But neither conformity nor diversity has virtures within itself, and neither is, therefore, of value in itself. These, also, must be related to the purposes of the institution if they are to have meaning; thus, the characteristics of the institution as it is must be studied in relation to its stated purposes in order to relate its effectiveness to its aims. How can the administration tell, for example, anything about its needs for faculty unless it knows what the institution plans to offer in the way of curricula and how these curricula relate to institutional purposes? How does it know about faculty qualifications unless it has studied them; and how are changes in these known unless they have been the subject of continuous study? An institution may, quite without design, relate its purposes to the qualifications of its current (and possibly powerful) faculty rather than the other way around. It is difficult to understand how complacency can exist in an education institution, but sometimes it does because the institution does not examine itself as carefully as it examines even its lowliest applicant."

In a later comment, concerning objectives and programs for achieving them, West says:

> "Within the bounds of objective study and an expectation of rational analysis and application, institutional research can make substantial contributions in the area of policy making, of long-range planning, of evaluation, and of management. It becomes, in practice, the systematic, continuous, organized, purposeful, evaluative study of the institution itself."

The Processes of Administrative Research

Administrative research consists of two major processes, each of which can be broken down into several subprocesses. (See outline.) The first consists of analysis of the decision situation. The components of a decision situation consist of the (1) decision-makers, (2) the objectives, (3) the system or environment in which decisions are made and operations carried on, and (4) the factors and alternatives which are available. It is therefore clear, as viewed by simple administrative research techniques, that a decision is seldom, if ever, the simple matter of selecting or not selecting a course of action. Indeed, this would be an oversimplification of the entire procedure.

The second major process consists of the definition of function and the construction of models to represent the interactions of objectives and the factors affecting them. The models are then solved to yield the highest over-all effectiveness for the system as a whole. Again, this process can be further subdivided.

These processes are not discrete, nor are they necessarily sequential or chronological. For example, in analyzing the decision situation, the construction models will most likely be considered. Also, the types of studies available in the process of defining functions and constructing models would in some ways determine the analysis of the decision situation and the establishment of controls over the functions and solution. Solving of models would be considered while constructing models to be sure that solutions were available for models being developed. While analyzing the decision situation, an administrator would most certainly consider putting solutions to work and controlling them. He would want to be certain that the solutions were possible and legal, etc.

Other examples might be given to illustrate the nondiscrete and nonsequential nature of these processes. Any attempt to initiate administrative research in an organization would begin with analysis of the decision situation, but almost immediately the other processes would become involved.

Analysis of the Components of the Decision Situation

Administrative problems and resulting decision situations involve the effectiveness of the organization as a whole and conflicts of the interest and/or effectiveness of functional units within the organization. For example, private colleges have multiple goals. Oversimplifying, two of these might be to meet the needs of the students and meet the needs of the constituents. Often these conflict. What balance between the two would maximize the over-all effectiveness of the college? Within organizations conflicts of interest and/or effectiveness also arise. For example, it is the purpose of teachers to teach and counselors to counsel and guide students. How might time, energy, funds, etc., be allocated so that the student is maximally benefited?

After identifying a problem or issue faced by a decision-maker, one must translate the situation into a research problem which can be studied by scientific methods. This particular task is centrally important to the whole process of administrative research, for, in a sense, it epitomizes the total concept, requiring as it does the formulation of objectives and procedures and the projection of possible outcomes.

To understand this process one must first define the system or environment. The system or environment consists of the participant, those who are affected by the courses of action, those for whom the objectives are specified, and the decision-makers. It is often useful to think of this in terms of a communication network. In a given educational system this might consist of constituents, board members, administrators, faculty members, students, employers, etc.

Analysis of the decision situation would actually depend on thorough analysis of the communications and control network of the organization. Such analysis would be needed to identify the components of the problem, to permit the construction and solution of models, and to administer the testing of models and the solution. Initially, this requires three general types of knowledge about the communications network. First, the status of the network at the present time must be established. Second, the control processes within the network must be analyzed, generally as belonging to one of five categories. Third, changes in the network and control processes over a period of time must be identified. One must identify the units or individuals within the organization, specify the processes they perform, and indicate the direction of input and output in relation to the other units and individuals in the organization. There are a variety of sociometric and psychometric methods as well as less sophisticated techniques for the analysis of communications systems. It must be remembered that the term "comminications system" does not refer only to the flow of information.

There are a variety of control processes which can be schematically and mathematically represented for purposes of analysis. In general they may be classified into five categories.

Transformation processes receive input and produce output. These may vary from simple conduction or transmission to various transformations of the input before it becomes output. A clerk opening mail would be representative of this process.

Sorting processes or systems are characterized by at least two output channels. Input from one or more sources is sorted, recognized, analyzed, and discharged into the two or more output channels. A clerk sorting mail would be representative of this process.

First order feedback mechanisms compare output to input or pre-established standards. Basically, such processes operate to maintain goals that have been established. The incumbering of accounts, as the result of orders placed, would be representative of first order feedback. The purpose of this process, of course, would be to prevent orders from exceeding budgetary limitations.

Memory units within systems or networks permit second order feedback and goal-changing behavior. The previous example might be expanded to illustrate this process. If orders are received which would exceed the balance available within budgetary categories, first order feedback would result in rejection of the order. If memory units are available, second order feedback would then examine the memory to see if past experience indicates that funds within the given budgetary category are soon to be replenished. If this is indicated, second order feedback might permit the processing of the order to continue. An example might be overdrawn bank accounts.

Reflection permits third order feedback, another type of goal-changing behavior. In addition this permits the restructuring of memory, based on current inputs to produce and to recognize new alternatives. Psychologically, this would be called consciousness. Pursuing the previous example, reflection processes might decide that the order in question should really be placed in another budgetary category, that budget funds might be transferred from one category to another, that the order might be delayed, etc.

It now becomes necessary to identify decision-makers. Several qualities identify decision-makers. They are usually responsible for recommending and modifying policies. Their approval is required and is expressed before policies can be modified, executed, or implemented. They must usually grant final approval and often posses veto powers. They are responsible for the evaluation of actions taken. There may be many decision-makers within an organization, but for purposes of considering over-all effectiveness, it is conceptually permissible to think in terms of only one decision-maker. It is often convenient to think of this person as a board of control, president, etc. Formal organizational charts are usually of little or no help in identifying decision-makers.

The identification of decision-makers is important, since they are the ones with problems and objectives which can be valued and which must be obtained or maintained. Operationally, they define the objectives, methods for measuring the achievement of objectives, and specify the measurement of the efficiency and effectiveness of alternatives when applied to objectives. Similarly, they operationally define the alternatives or courses of action.

The objectives, in their raw form, must be refined, edited, and stated in measurable form. Objectives which must be achieved in order for other objectives to be achieved can be eliminated since they are really means to the final objectives. Objectives which cannot be obtained, maintained, or effected by available alternatives must be eliminated. Analysis will usually show that many objectives, although stated in slightly different terms by different units or decision-makers within the system, are actually identical and can thus be combined. By these and other ways the objectives are reduced to manageable and realistic form.

A measure of over-all effectiveness must be selected so that it can be used to evaluate the extent to which the objectives are achieved. In business and industry the achievement of such diverse objectives as maximizing profit, increasing customer good will, and maintaining family control of the business can all be measured in terms of money. This is always a problem, but there are various methods available by which this can be done (3).

For example, in an educational institution one might have the following three objectives: 1. to minimize expenditures, 2. to increase student achievement, and 3. to maximize public support for education. It would be possible to equate all of these objectives, for example, to dollars and cents. It is not important what measure is selected, only that one measure is selected for all objectives so that their relative value can be established.

Some may think that it is impossible to do this. The fact is that it is done all the time. Every time budget decisions are made, educational gains are being weighed against dollars. The public does this every time it votes on bond or tax issues. When administrators drop or add classes or make other curriculum changes, they are weighing dollars, educational gains, and morale values on the same scale. The problem here is not *can it be done*, but *how accurately can we measure what is being done*.

The weighting of objectives is of primary importance and is related to the establishment of an over-all effectiveness measure. It involves the estimation of the relative value of the various objectives. It is accomplished by answering such questions as these: How many dollars is a given rise in achievement measures worth? Is student achievement twice as important as public regard or of equal importance? There are sufficiently reliable and valid techniques for answering these questions.

Many factors in a situation might affect the achievement of objectives. In general these are uncontrolled factors such as in-migration, enrollment increases, changes in tax values or other sources of monetary support, or they are alternatives (controllable factors) or courses of action which decision-makers can manipulate or select, such as salary schedules, curriculum, and class schedules.

There must be at least two factors (alternative courses of action or uncontrollable factors) in order for a problem to exist. Alternatives can be regarded as changes in the system. These might be changes in personnel, such as reducing, augmenting, changing the nature of training, and qualifications. Alternatives might also consist of changes in operations, such as small classes, large lecture sections, team teaching programmed instruction, and individual study. Others might consist of changes in materials and/or machines which in educational jargon would be defined by such things as student characteristics, entrance requirements, selective admissions, and all types of curriculum changes and emphases. Other alternatives might involve changes in the actual environment, such as small institutions versus large institutions, building design, and teaching materials and equipment. These alternatives would be refined and edited in much the same way as the objectives.

Construction and Solution of Models

A variety of studies and processes would be required to construct and solve models which represented relationships among factors and objectives. Many of these studies would resemble those now found in the category of research known as institutional research. Predictive and follow-up studies would be especially relevant, as would findings of pure research.

The construction and solution of models involves the defining and testing of an efficiency function. An efficiency function would indicate the extent to which a given alternative or uncontrollable factor affects the achievement of a given objective. Therefore, for each alternative or uncontrollable factor there would need to be an efficiency function for each objective.

After a set of relationships has been determined, control procedures must be developed and established to check on them constantly. If the relative importance of objectives changes, or if the efficiency function between an alternative and an objective changes, the decision-maker must become aware of this, to avoid making decisions based on incorrect data or models. These are, in general, the usual administrative on-going data, information-storing, and analyzing processes of any institution.

Models are useful in many lines of endeavor. Basically, there are three broad types of models. 1. Iconic models are models which "look like" that which they represent. Small scale models of machines and vehicles would be iconic models. These are least useful from the standpoint of systematic and scientific analysis of systems. 2. Analogue models are somewhat more useful, but still do not lend themselves to rigorous analysis. Analogue models usually represent reality through analogous materials. For example, colors on a map may be used to represent topographic features of a given area. Length measurements on a slide rule represent mathematical relationships. In some varieties of research electrical currents and pulses represent the flow of pressure and water within canal systems, etc. 3. Symbolic models are most useful for rigorous analysis. In such models elements of reality are represented through mathematical processes. For example, the relationships among speed, distance, and time may be represented by arithmetical formulas. Calculus permits the derivation of formulas to represent the acceleration of a falling body.

Basically, there are five categories of symbolic models that have generally been shown to be useful. The variety of possible models within each of these categories is probably infinite. The usual linear and multivariate statistical models are also available.

Inventory models, in classical operations research, usually represent problems associated with finding the optimum combination of time and amount of ordering or otherwise procuring certain supplies. In such models the time may be fixed and the quantity variable, the quantity fixed and the time variable, or both may be variable. Numerous examples in educational institutions immediately suggest themselves in this category. The procurement of textbooks and all sorts of supplies are obvious examples. The processing of student admissions, as related to faculty procurement, might also be usefully investigated through such techniques. Other processes, such as decisions to issue bonds, construct buildings, and install equipment, might be appropriately managed through such models.

Allocation models generally relate to problems in which certain activities must be accomplished to certain degrees with certain resources. The problem is, usually, how should the resources be allocated to the activities so as to maximize the over-all effectiveness? Other varieties of allocation models involve the specification only of resources and not activities, or the specification only of activities and not resources.

In industry the question of allocating given machines or plants to the production of given commodities is an example. The manipulation to transportation systems is another variety. For example, how can a given number of school buses, garaged at specific points in a district, be routed to pick up and deliver students to their schools, minimizing such things as cost and student time enroute. Other problems which might be profitably investigated by such techniques would be the assignment of faculty members to various activities, the allocation of various curricilr programs among schools in given geographic areas, or the allocation of rooms and facilities within a given institution to certain activities, so as to minimize such things as room usage.

Waiting line models in business and industry might illustrate supermarket check-out stands, tool supply rooms, and vehicles and passengers arriving at transportation terminals. In general the problem takes two forms. The arrival of certain units, with certain characteristics and needs, is known (although there is usually a random process in operation), and facilities to meet these needs must be determined; or the facilities are fixed and the problem is to determine the proper scheduling and distribution of the arriving units. Many elements of concern to educational institutions would appear to be relevantly associated with these models. Attempts to answer questions such as how many students and what kind of students may we expect next year, or five years from now, might be profitably investigated with such models. Or, given knowledge of the number and nature of future student bodies, how might we best alter facilities and faculty within the given time period to meet this anticipated need?

Replacement and maintenance models in industrial and business operations research take two general forms. One form is concerned with the replacement of items which are subject to sudden failure. A relevant example would be if a particular part of a machine has a failure pattern, how might the probable cost of "down" time be related to the cost of maintaining spare parts, so as to maximize the efficiency of the operation? The other form regards the deterioration of items. For example, the quality of products from certain types of machinery declines as the age of the machinery and its use increase. What is the optimum time to replace or repair the machinery, to maximize profits, while considering the cost of "down" time, the cost of rejecting completed goods, etc. The problem of teacher turnover, dismissals, illnesses, substitution, and sabbaticals might be fruitfully investigated through such techniques. For example, how many faculty members will leave the institution during the summer months? Should these anticipated shortages be met by hiring surplus faculty members or by maintaining a staff of stubstitutes? What is the cost of hiring additional instructors and substitutes as opposed to the cost of teacher overloads, crowded classes, and double sessions?

Competitive models take two general forms. One, which might be called games, is involved with the identification of optimum strategies or courses of action, given certain rules and probable opponent or competitor actions. Given that the opponent has courses of action L, M, and N available to him, each with certain probabilities, what is the best course of action? These models are of immediate use in the business world, in such areas as stock market manipulations, insurance, advertising, market control, and politics. These models might be useful for an administrator trying to select the best courses of action to initiate in September, given that bond elections may pass or fail in November with certain probabilities, that tax override elections may pass or fail in February with given probabilities, and that a neighboring district may open a new school in February or next September with given probabilities.

Another category of competitive models is that of bidding models. These are immediately relevant to business and industrial problems involved with submitting competitive bids to secure contracts, and to the extent that competitive companies "bid" for customer considerations. This type of model might be useful for educational administrators competing for faculty members, or for educational institutions competing with other public institutions for tax funds, public support, etc.

In reality, of course, models being constructed to represent systems will seldom be limited to one of the varieties discussed. Seldom are systems or organizations this simple. If a large industrial organization is represented by a model, such a model would probably draw from all five varieties. It is probable that complexities in educational institutions, no matter what level, are at least of this order. For analytical purposes, related to specific time periods or specific subsets of problems faced by the administrator, more simplified models, perhaps restricted to one category, would probably be useful.

Of primary concern is the criteria for selecting the components for models. If the assumption is made that a given model represents a real system, this assumption is only valid to the extent that the components represent the relevant elements of the real system. For example, if an important component of the system is not identified and included within the model, the validity of the model and derived solutions would be questionable. If an available alternative is not identified or developed, an optimum solution can never be certain. Similarly, if an important objective is not identified, confusion will probably result. If the effect of a particular unit within the system is not properly assessed, inaccurate results are almost certain.

Several methods of solving models, to identify the results of the relationships among the components, are available. In business, industry, and military organizations, these are often quite complicated, requiring the services of skilled mathematicians. Due to the nature of the variables of concern in educational organizations, it is suspected that these relationships would not be as mathematically sophisticated. Only further study, research, and application will answer this question.

In general there are optimum solutions which involve the effectiveness of a total organization, and suboptimum solutions which involve the effectiveness of parts of the organization. In business, industry, and the military, suboptimum solutions are seldom of much use. It is probably that further work will indicate that suboptimum solutions are of greater usefulness and importance for educational organizations. This decision (optimum or suboptimum) must necessarily be made when the research problem is formulated--when the components are identified.

An example might serve to illustrate further the concept of administrative research. We will assume that the three identified objectives and the two alternatives (mentioned earlier) are discrete and exhaustive. A and B, as before, will represent the alternatives. C, D, and E will represent the relative importance of the three objectives. This assumes that a common measurement scale has been derived for them. As before, U, V, and W represent the efficiency with which alternative B achieves the three objectives, and X, Y, and Z represent the efficiency with which alternative A achieves the same objectives. To simplify the arithmetic, the importance (C) and the efficiency functions (U and X) for the first objective (cost) will be "inverted." That is, a higher function will represent lower cost, a lower function will represent a higher cost, and a higher "importance" of lower cost. S represents the effectiveness function for alternative A, and T represents the effectiveness function for alternative B. It must be remembered that this is the over-all effectiveness of the organization, not for any single objective or group of objectives.

The following may then be regarded as the "concept" of operations research as applied to executive decisions in an organization.

Figure 1

$$\begin{array}{cccccc} & & & A & B & \\ C & D & E & X & U & = S \;\; T \\ & & & U & V & \\ & & & Z & W & \end{array}$$

The arithmetic would be as follows:

$$CX + DY + EZ = S$$

$$CU + DV + EW = T$$

Having gone through this process, the decision-maker would be bound to the selection of alternative A if S is larger than T, or alternative B if T is larger than S. This is not mechanistic and does not replace the decision-maker by some abstract formulas, machines, etc. Rather than base his decision on the rather gross dichotomy of either A or B, he made a number of small decisions (and hence probably more valid and reliable) when he developed C, D, E, X, Y, Z, U, V, and W. Naturally, this could be expanded to include as many objectives, alternatives, and uncontrollable factors as necessary. When the relationships are more complex than those implied in this example, more complicated "models" must be sought to explain the relationships. Seldom are the objectives and alternatives discrete.

The final process in administrative research might generally be described as the leadership aspect of administration. This involves finding ways to implement changes in the system which appear to be desirable. In other words, if administrative research indicates that alternative B (tutorial examination system) should be adopted, how does one go about making the necessary changes in the system?

The information gained in identifying the components of the system would, of course, be invaluable, especially the communications and control aspects of the system and the identification of the decision-maker.

To summarize, it is suspected that administrative research, as a methodology, a way of looking at problems, a method of analyzing problems, a technique for understanding and controlling the processes of complex systems and organizations, would be useful in educational systems and organizations, would offer a rationale for the combination and coordination of existing types, techniques, methods, and theories of research.

Outline of Processes of Administrative Research

1. Analysis of the components of the decision situation

- A. Defining the system or environment
  - 1. Status of communications and control network at a given time
  - 2. Control processes in communications network
    - a. Transformation
    - b. Sorting
    - c. First-order feedback (goal maintaining)
    - d. Memory (permits second-order feedback; goal changing)
    - e. Reflection (permits third-order feedback; goal changing; recombination of memory to produce and reorganize new alternatives; consciousness)
  - 3. Change of communications network and control processes over time
- B. Identifying decision-maker(s)
- C. Identifying the objective(s)
  - 1. Editing objective(s)
    - a. Elimination of prerequisite objective(s) (means)
    - b. Elimination of objective(s) unaffected by alternatives
    - c. Combination when possible, especially when same objective is specified by different units of organization
  - 2. Defining effectiveness measure
    - a. Quantitative objectives
    - b. Qualitative objectives
  - 3. Weighting objectives
- D. Analysis of factors affecting achievement of objectives
  - 1. Identifying and editing alternatives (controllable factors)
  - 2. Identifying uncontrollable factors

II\. Construction and solution of models representing interactions among alternatives, uncontrollable factors, and objectives

- A. Defining the testing "efficiency" function for each alternative with each objective, defining relationships between uncontrollable factors and objectives, and defining relationships between uncontrolllable factors and alternatives
  - 1. Gathering of information through studies to define the test functions
    - a. Experimentation--external--internal
    - b. Studies--internal
    - c. Survey--external
    - d. Investigation

  2. Establishing controls over functions

B. Solution of model yielding effectiveness function for each alternative

  1. Iconic models
  2. Analogue models
  3. Symbolic models
     a. Inventory models
     b. Allocation models
     c. Waiting line models
     d. Replacement and maintenance models
     e. Competitive models
  4. Selecting model components
     a. Pertinence of components
     b. Combining, dividing, and eliminating components
     c. Specifying fixed, variable, random, etc., components
  5. Solving models
     a. Analytical solutions
     b. Numerical solutions
     c. Monte Carlo solutions
     d. Optimum and sub-optimum solutions
  6. Putting solution to work

Selected References

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Alfred D. Cavanaugh
University of Detroit

You may have heard of Mark Twain's remark to the effect that all that is needed for success is ignorance and self-confidence. I would not care to detail the implications of this remark for college administration today; but I have a feeling that it may have been widely applicable in the more leisurely decades that preceded the Second World War, and even more so in the latter half of the nineteenth century, when the American system of higher education began to take on its present shape. Assuming that there is a grain of truth in Twain's assertion, we have a convenient explanation for the current emphasis upon information gathering and processing in higher education. Increasing consciousness of our ignorance concerning what goes on in higher education has undermined confidence in dealing with the future--a fearful future, fraught with financial logjams, tidal waves of students, knowledge explosions, and similar unnatural catastrophes. Indeed, I sometimes sense a feeling of near-panic among many experienced top administrators as they look into the future that our present-day educational Cassandras have detailed for us. It is highly logical that such a situation should generate a great demand for information--a logical step, but, as with most other logical steps, one taken only under a great deal of outside pressure.

Demand has created supply, and now we have a substantial number of information specialists. Companies such as IBM thoughtfully provide highly developed information-processing equipment, and lo! a new profession is born. The intellectual vistas that have opened are seemingly limitless, and of profound import for the future of society. I doubt if there is anyone involved in institutional research who has not at one time or another thrilled to the implications and potentialities of his work. But promise is not fulfillment, and the elation that comes from enthusiasm is often succeeded by a dull thud following the first touch of administrative reality.

Admittedly, the administrative situation is changing rapidly. Most significantly, we see about us the rise of a "new breed" of educational administrators, characterized, as so often their predecessors were not, by a hunger for information and open-mindedness with regard to new ideas. But we should be extremely wary of assuming that objectivity and creativity on the part of the top administration necessitate any delegation of administrative responsibility to the information specialist. Difficult as it may be for professional specialists to accept, the results of institutional research are destined to be used, and the determination of use lies in the hands of others.

This can be intensely frustrating for an individual, particularly since his work is so close to a point of decision and action that it is almost impossible--and, I would hold, undesirable--for him to abstract himself from consideration of the practical use to which his findings will be put. But his influence is at best indirect and incidental. Over a period of time he may find his position impossible to maintain with any degree of psychological stability. I suspect that institutional research specialists will, as a group, be themselves studied in another decade or two, and found to be characterized by a high degree of mobility, strong atavistic yearnings for the classroom or routine office work, and unusual susceptibility to offers of higher administrative positions.

In more particular reaction to the paper presented by Dr. Hunter, I would have to say, with all due respect to the efforts of IBM, that advances in computer technology have not really solved the basic problems of institutional research. Looked at in a rather pessimistic way, you might say that Dr. Hunter is showing us how to make our mistakes faster and more cheaply. In no way is this a criticism of the equipment as such. It is highly proper for technical experts to say, "Here is the equipment, this is what it can do, go ahead and use it." No assumptions need to be made about the competence of the person using the equipment, nor the ease with which his organization can assimilate the information produced. Hopefully, the existence of the proper tools will mean that, eventually, the job will be done. At least higher education is not alone in its dilemma: many businesses are running into similar problems in trying to accommodate themselves to the technological demands of the computer.

The facts of the matter are that institutions of higher education have in the past got along with so little information that it may well take a long, long while for them properly to assimilate and act on the information that is now becoming available. We are attempting to irrigate deserts, but we don't want a flood. Even simple facts go a long way, where they represent the first breath of reality in the decision-making process of a particular college. In the larger institutions the computer already has come into its own, but the work that it does is basically elementary: it is simply going through those ten thousand folders that Lee Hull referred to earlier and counting, albeit with fantastic efficiency. Its chief relevance is still in terms of speed and quantity; beyond simple statistical manipulations of the raw data its great mathematical power remains unused.

With regard to Dr. Hendrix' paper, I would like to raise an assumption not too often accepted or even discussed by administrative theorists. It arises from what I have already said, but I am proposing it here because of its theoretical importance for the future of simulation and model-building. It is this: that there is an essential discontinuity between research and decision-making. Dr. Hendrix seems to assume that there is not, and his argument follows skillfully and logically from that assumption. If information alone is to influence decisions, then obviously the highest-quality information that can be provided at any decision-point is the determining factor; and, ultimately, although obviously not in the near future, it should be possible to automate decision-making once a certain degree of sophistication in our techniques is achieved.

Frankly, this gets us into trouble as institutional research specialists. To the extent that we try to supplant our superiors by a simulated model, I suspect that we will quickly lose our jobs. "1984" is not here yet, and I doubt that many college administrators are anxious to hasten its arrival.

More seriously, there is a substantial jump between using a model as a convenient means of testing hypotheses, and assuming that the results of any test can be translated directly into action. In a recent article in the Harvard Business Review (March-April, 1964), John Dearden discusses at length the impracticality of the latter approach for business. An a fortiori argument is inescapable: if this cannot be done in business, how can it be done in education with its host of indefinable parameters?

What seems relevant to Dr. Hunter's paper seems to apply also to Dr. Hendrix' thesis. What we need now and for the foreseeable future are not highly developed models that tie research tightly into the administrative decision-making process, but rather as many pertinent facts as can be conveniently gathered and absorbed. Charles Babbage, a nineteenth-century inventory who anticipated the principles that underlie the modern computer, put the matter quite succinctly: "The errors which arise from the absence of facts are far more numerous and durable than those which result from unsound reasoning respecting true data."

This indeed is my own personal conviction, and how I see the job of the institutional research specialist. We are expected to provide relevant and accurate data for the administrators who have to bear the responsibility of making the final decisions. By sheer force of these facts, I feel certain that we will contribute mightily to the making of wiser decisions in higher education.

Joe L. Saupe
Michigan State University

There may be some overlap with the previous discussion in the points that I have to make, but it is possible that the approach may be sufficiently different to be of interest. Our charge here today is to discuss new trends of the far-out type. Despite this charge I cannot help but take a somewhat conservative point of view in reacting to the previous two papers, particularly to the latter. I say particularly the latter because I think I can visualize the "total systems concept" of data in the higher educational institution, as this concept was described by Dr. Hunter. I have difficulty, however, in perceiving the higher institution itself as a system to be completely described by quantitative values and mathematical relationships, as outlined by Professor Hendrix. My somewhat disconnected series of remarks, based upon this conservative frame of reference, may, then, bring realism to the latter, idealistic statement; they may bring us back to earth, so to speak.

My first reaction has to do with the implementation of the ideas discussed in the papers. Dr. Hunter talked about this in terms of the necessity for an integration of efforts in developing the total information system, and the need for the support of all university officers. I submit, and it is a fact of life, that many if not most of our top university officers have not passed through the third and fourth stages of Professor Doi's analysis of the sequential development of higher institutions. Thus, they are not now and some may never be ready to use the advanced and complex techniques outlined in Professor Hendrix' paper. On the basis of the very sound principle that the administrator can be expected to use information in management processes only if he comprehends the information and the procedures used in deriving it, Professor Hendrix' paper carries the implication that what we may need in the future is a course in matrix algebra for college presidents. My point is that there is some very difficult work yet to be done in integrating the efforts of the various university offices on many of our campuses, if we are to develop common grounds for communication among the offices and the officers, so that computers may communicate for them across the various responsibility areas. The only example I have from my own institution, and I doubt if it is more backward than most others in this respect, is the simple matter of department codes. Each administrative office that handles institutional data at my institutions has one or more coding systems which it uses for departments. Except for our office, most of these are designed only to arrange departments in alphabetical or administrative organization order. Maybe what is needed in order to solve problems such as this is for the institutional research agencies to take the initiative and actively promote the development of the coordination needed for integrated data systems. This is a justifiable role for us because, again, as Dr. Hunter very pertinently pointed out, the data that we need and use in institutional research are more often than not the same basic data that are maintained in the several other record-keeping offices of the institution.

My second point is that Dr. Hendrix' paper is an interesting academic exercise. Because I am open-minded and committed to the aims of scholarship, I hope that he continues it. I think he would admit that what he is doing is exploring a problem area, and he would not claim to have final answers to present to us. However, I am not as convinced as are some others that it will ever come to pass that the "total operations analysis" technique will be applied to higher institutions. Maybe ten or twenty years from now we may be far enough advanced in concepts and techniques to use some of the ideas of this global approach to institutional management. In the meantime, the show must go on. I will be back in the office tomorrow and will be expected to be carrying out institutional research.

My next point is a rather fundamental one. A major requirement of Professor Hendrix' system is that all factors or components in the environment be measurable, and even that all be measured on the same continuum. Furthermore, primary factors or components of the system are institutional objectives. While my view may be limited, I cannot perceive of a common continuum for the measurement of, and I quote from his paper, "1. to minimize expenditures, 2. to increase student achievement, 3. to maximize public support for education, " which has sufficient validity to justify its use in the complex mathematical formulation underlying his approach. I submit, as did Professor Cavanaugh, that the weighing of whatever modest evidence we can provide to university officers is an essential ingredient of management processes which keep the institution viable.

More specifically relevant to the measurement requirement is the point that achievement tests can, I am convinced (and many others do not believe this), be quite relevant to certain classes of institutional objectives. They are, however, relative measures, not absolute measures, and on this basis cannot be combined with other measures on any absolute scale continuum.

The fundamental principle involved here--and it bothers me considerably in my work--is that "the best education is that education which is least measurable." This principle has wide applicability. For example, in achievement tests the measurement of knowledge of facts is considerably easier than the measurement of creativity. In institutional cost and faculty load studies the measurement problem is much easier, if all instruction takes place in organized classes with one instructor for each class than it is when team teaching, independent study, television, and other atypical and, perhaps, "better" arrangements are used. You may extend the list of illustrations of this principle for yourself.

Another point is related to the fact that some of us may have concluded from this three-day meeting that it is somewhat futile to attempt to define "institutional research." While I resist entering this arena of definition, I cannot resist commenting that I don't like to be subsumed by anything whether it be operations research or administrative research, and Professor Hendrix argues that institutional research is so subsumed. The proper conduct of institutional research has much in common with many of the ideas he discussed, except that we use less-sophisticated, less-integrated approaches than those described. For example, a basic concern for institutional objectives and the attainment thereof should underly any institutional study, whether it be of teaching methods or of teaching loads.

In the early and major portions of Professor Hendrix' paper, he emphasized the analysis of the "total system" and over-all institutional objectives. Later, and thankfully to me, he talked about more restricted areas and analyses of "subsystems" which might lead to "suboptimum solutions, " if I am using his terminology correctly. I feel more comfortable with this latter approach; it strikes me as more like what I have been doing in analyses of the instructional program, in depth studies of individual departments, in studies related to specific problems, and so forth. For example, he discussed "inventory, " "allocation, " "waiting line, " and a couple of other models which appeal to me on the basis of their potential utility in solving restricted problems.

At this point, the model or models outlined in his paper are exceedingly more likely to be of use in studying specific areas or in solving specific problems than in dealing with global problems or total institutional operations.

Professor Hendrix suggested that models in education will not be as sophisticated mathematically as those in business, industry, and the military. I submit that after the ten or twenty years are up we will find the models for education even more sophisticated than those in the other enterprises. They may even be impossible to understand. Even if they can be formulated, as I mentioned earlier, the decision-makers, by not being able to understand them--even with the course in matrix algebra--won't believe them. We have enough difficulty explaining to them what we mean by "full-time-equivalent faculty."

Another reason that I'm not going to go home and try out this somewhat grandiose approach to the development of data for decision-making is that any decision that is made changes the system and may even change it so drastically that the original analysis will be effectively invalidated. Much time, effort, and expense would have to go into the original analysis, and it would in all likelihood result in its own obsolescence. One reason for the existence of officers of institutional research is the fact that the registrars and business officers could not adapt to the job when Professor Doi's third, fourth, and fifth stages in the evolution of higher institutions were reached. A related reason may be that these officers resisted changes because changes upset their record systems. I hope that institutional research people will have that adventuresome spirit that will enable them to welcome changes, to scrap the methods and results of earlier studies, and to begin anew on the basis of the changes they have helped bring about.

I like the suggestion of Professor Hendrix' paper that institutional analysis must by nature be interdisciplinary. Institutional research cannot become a true discipline in any traditional sense. Institutional research needs the help of many academic specialities in knowledgeably carrying out the diverse types of studies that are needed. It is significant to note that we have these resources on our campuses, in the form of faculty members in academic departments. The only problem is to convince them that research in higher education--even research on a single institution--is a respectable area for work.

If I criticize Professor Hendrix' ideas, I must suggest alternatives to them. Therefore, I will mention a couple of approaches to institutional research that have interested me. First, I have been intrigued with the methods that some people have been using to project course enrollments and the uses that they are making of the projections in academic management and planning. Maybe this is really an example of a "simulation technique." If this is true then it is easier for me to think or talk about "simulation techniques" because I have seen an example of one.

Another intriguing study is being carried out by Dr. John Dale Russell at Indiana University. He is surveying all the offices on the campus of Indiana University, to determine what institutional data are maintained in these offices, and he is developing a taxonomy and a catalogue of the types of data. This type of analysis will be of considerable value to the Bureau of Institutional Research at Indiana and would be of similar value to other institutional research offices in helping them go about their job. It will very effectively reveal duplications of efforts, instances where communication is lacking, voids in types of data that can or should be collected, conflicting definitions and categorizations of data, and so forth. These types of knowledge should be invaluable in attempts to increase the coordination of administrative offices, to move in the direction of the integrated data systems of Dr. Hunter's paper, and even to develop the systematic types of measures required for the techniques suggested by Professor Hendrix.

Finally, out of concern for the criticism of institutional research and other offices that data are often compiled, analyzed, and reported in the absence of a consideration for the intended uses of the data, I have thought about attempting to study and categorize the decisions that are made in the planning, management, and evaluation process of higher educational institutions. An analysis of the decision types and categories might produce enumerations and categories of data that would be needed for and relevant to the decisions, and thereby provide a framework within which institutional research in cooperation with other offices could rationally plan the types of data to be collected, stored, and reported and the types of special studies that are needed.

In summary, let me say that, while some of my remarks may have been critical, and I hope they were constructive, these two papers have focused attention upon what I consider to be exceedingly significant problems faced by institutional researchers: namely, the need for that increased communication, cooperation, and coordination among diverse responsibility areas that will lead to the integration of basic record systems, the need to keep institutional objectives and purposes at the center of our attention in carrying out institutional studies, and the need to develop new and imaginative methods for studying and solving the variety of problems and making the variety of decisions faced by our institutions.

Keith W. Smith

Southern Illinois University

In contrast to the approaches of the previous respondents in which they felt the impracticability of the two new techniques of the full data system and methodology of operation research would cause them at some time to be a threat to us in our job, I'm going to take the position that we had better all be alert, at least, to this threat because we may be much closer to it than we know. If it is indeed a threat, I think the advent to total information banks, and the accessibility to them, are certainly a near reality. They are going to be in our institutions very shortly, for better or for worse.

I also believe that the application of operations research techniques to decision-making and planning in higher education can help us to lead ourselves away from the era in which, as Al Cavanaugh said, the institutional or the executive behavior is best defined as that by an individual who has enough intestinal fortitude to make decisions without any information whatsoever. This is in contrast to some place on a continuum where the decisions, the alternatives, and their consequences can be better judged with data available immediately for the judgment. My fear is that we may forget in looking at this new technique and technology that we may be facing two very critical problems. The first is generally summarized as some kind of a mechanization of decision-making in which full faith and trust is placed in automated systems and in techniques in which we over-rely on their validity and reliability to our situation. A second possibility which frightens me is that the models that we create by our "new technique" approaches could very well be cast in the form of our present obsolete organizations and practices of higher education.

In the Automation of Knowledge, a paper presented to a conference on higher education in Chicago last month, Louis Munford likened the threat of automation in higher education to the plight of the sorcerer's apprentice. Perhaps we in higher education, like the sorcerer's apprentice, have set in motion the academic brooms and pails of water in increasing numbers and at ever-increasing speeds without the old magician to stop this process before we drown in the melee.

I am saying that I fear that we may be closer to this than we realize. I read in Science Newsletter just yesterday that a machine was developed at the University College of London which can, when presented with an array of its own components, simulate itself. I have spent some time where I have seen operations control systems in which computers are not only recreating their components, but they are testing whether or not they made any mistakes. Perhaps we are approaching the level of sorcerer's apprentice.

My response to the papers is then intended as a caution against the increasing tendency to accept automation in the place of humanism, as we enter the age of scientific management in education.

Misinterpretation of facts is not a new phenomenon. I, too, would like to refer to Mark Twain, as did Al, when Twain observed in his Life on the Mississippi that scientists had discovered that the length of the Mississippi channel was being shortened at the rate of approximately one mile per year by the annual seasonal flood and the changing of that channel. His first observation was that perhaps at the close of the last glacial period the Mississippi was some six or seven thousand miles long and extended out over the Gulf of Mexico and points south like a great fishing pole. He further predicted that the citizens of New Orleans and of Minneapolis, Minnesota, would at some future time be involved in the problems of a single metropolitan form of government.

The use of budget formulas and cost formulas bothers me. At a recent meeting of our state budget committee it was observed by one person, a heretic, that if it was going to cost some forty-five hundred dollars per year to educate a graduate student, we had better ask the legislature to appropriate forty-five hundred dollars for each of them and send them off to Harvard.

In the creation of our master plans in the state of Illinois, it is observed in statistics of demography that we in southern Illinois, one of the depressed areas of the USA, are faced with the unusual circumstance in 1980 of having a minus two hundred people of the ages eighteen to twenty-one in eight of our counties.

My plea is that automated knowledge and interrelation of this knowledge is a critical problem for institutional researchers and the people they serve. I would suggest a reading by anyone in this business, or anyone related to higher education, of the paper by Munford. It will be in the proceedings of the National Conference of Higher Education.

The real threat then is that someone is one day soon going to develop a computer with a human arm and internal source of power.

Now lest this challenge be misinterpreted, let me again reiterate that we are in the throes of developing a total information system for our institution with all manner of high-sounding equipment. We really believe and have faith, or we would not be in this business, that this can help us as can the operations research techniques which, up to now, have, in my opinion, not been completely tested in industry and military.

We look forward to a better day in administrative behavior in our institution. Yet we hope that we will not become overly proud of our new toys and our new techniques in the inquisition of fact and methodology to the point where we forget the inquisition of the fact or knowledge within a framework of human experience and time-tested values of the human personality who makes judgments. Administrative officers must retain a freedom to make judgment errors just occasionally, for this freedom of choice permits us to explore new and suboptimal paths of the maze and to anticipate the unexpected and the accidental forces which will come. From this choice or this freedom to make errors, we are going to get the bold innovations and perhaps some risky plunging that are so badly needed now in our present dilemma and are absolutely essential if we are to do our future job in higher education. We are grateful for the tools and the methods which can be provided to us to sharpen our administrative procedures, but we must insure the role of the human personality, with its infinite complexity, as the old sorcerer's magic to stop the brooms and the buckets of water we have set in motion.

APPENDIX

PROGRAM
FORUM PARTICIPANTS

PROGRAM

FOURTH ANNUAL NATIONAL INSTITUTIONAL RESEARCH FORUM

Sunday, May 17

7:45 p. m. - General Session

Presiding: John E. Swanson, Chairman
Planning Committee
Director of Universities Study
The University of Michigan

Welcoming Remarks:

John E. Stecklein, Chairman
Local Arrangements
Director, Bureau of Institutional Research
University of Minnesota

Panel: A Conceptual Framework for Institutional Research: Three Points of View

Samuel Baskin
Director of Program Development and Research in Education
Antioch College

Stuart Grout
Director of Academic Services
Boston University

Robert E. Hubbard
Director of Institutional Research
Wayne State University

Monday, May 18

9:00 - 9:45 p. m. - General Session

The Role of Institutional Research in the Formulation of Policy

Presiding: Thomas H. Shea
Director of Office of Institutional Research
State University of New York

Panel: Eldridge Scales
Associate in Higher Educational Research
New York State Department of Education

Vernon Hendrix
Assistant Professor of Education
University of California at Los Angeles

Lois Torrence
Director of Office of Institutional Studies
The American University

10:00 - 11:30 p.m. - Discussion Sections - (Five Sections in Five Rooms)

Institutional Research and the Formulation of Policy in Specific Areas

Discussion sections will be held following the presentations on Monday morning, Monday afternoon, and Tuesday morning. These sections, each of which will be concerned with the same area at each meeting, will examine these areas in the light of the preceding presentation. Participants may continue with the same section each time or may choose different sections each time from the following:

Section A - Whom Should the Institution Serve?

Discussion Leader: Stanely O. Ikenberry
Assistant to the Provost for Institutional Research
West Virginia University

Section B - What Staff Does the Institution Seek to Attract?

Discussion Leader: Urban G. Fleege
Associate Vice President for Institutional Research and Educational Planning
DePaul University

Section C - How Should the Institution Be Supported?

Discussion Leader: Homer E. Still, Jr.
Associate Director, Universities Study
The University of Michigan

Section D - What Should Be the Building Program of the Institution?

Discussion Leader: Robert B. Smawley
Director of Educational and Institutional Research
Eastern Washington State College

Section E - What Should Be the Curriculum of the Institution?

Discussion Leader: Galen Drewry, Director
Institute of Higher Education
University of Georgia
Athens, Georgia

1:30 - 2:15 p.m. - General Session

The Role of Institutional Research in the Implementation of Policy

Presiding: James L. Miller, Jr.
Associate Director for Research
Southern Regional Education Board

Panel: D. Gordon Tyndall
Director of Analytical Studies
University of California

Carl E. Wedekind
Director of Educational Planning
University of Pittsburgh

3:00 - 4:30 p.m. - Discussion Sections

Section A

Section B

Section C

Section D

Section E

Tuesday, May 19

9:00 - 9:45 a.m. - General Session

The Role of Institutional Research in the Evaluation of Policy

Presiding: David V. Martin
Coordinator of Institutional Studies
Duke University

Panel: Everett H. Hopkins, Vice President for Planning and Institutional Studies
Duke University

Charles E. Howell, Director
Bureau of University Research
Northern Illinois University

James R. Montgomery
Director of Institutional Research
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10:00 - 11:30 a. m. - Discussion Sections

Section A

Section B

Section C

Section D

Section E

1:30 - 2:30 p. m. - Business Meeting, NIRF

Presiding: John E. Swanson

Greetings: O. Meredith Wilson, President
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2:30 - 3:00 p. m. - University of Minnesota West Bank Campus Planning

Winston A. Close
Professor and Advisory Architect
University of Minnesota

3:15 - 5:00 p. m. - Tours of Campus and Institutional Research Facilities

7:30 - 9:00 p. m. - Evening Session

Presiding: L. Joseph Lins
Professor and Coordinator of
Institutional Studies
University of Wisconsin

The Role of Institutional Research in the Administrative Process

James I. Doi
Director of Institutional Research and
Professor of Higher Education
New York University

Wednesday, May 20

9:00 - 11:30 a. m. - General Session

New Techniques in Institutional Research

Presiding: Leroy E. Hull
Associate Director, Bureau of
Institutional Research
Indiana University

Panel: G. Truman Hunter
Administrator of Educational Program
Data Processing Division
International Business Machines

Vernon Hendrix
Assistant Professor of Education
University of California at Los Angeles

Al Cavanaugh
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Adjournment

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